VISTA

THE AMERICAN MATHEMATICAL MONTHLY

THE OFFICIAL JOURNAL OF THE
MATHEMATICAL ASSOCIATION OF AMERICA
(INCORPORATED)

DEVOTED TO THE INTERESTS OF COLLEGIATE MATHEMATICS

EDITED BY
LESTER R. FORD, Editor-in-Chief

WITH THE CO-OPERATION OF

E. F. BECKENBACH
L. M. BLUMENTHAL
N. B. CONKWRIGHT
H. S. M. COXETER
W. M. DAVIS
OTTO DUNKEL
H. P. EVANS
B. F. FINKEL
J. S. FRAME
ORRIN FRINK, JR.
MARJORIE GROVES
M. R. HESTENES
B. W. JONES
R. E. LANGER
C. V. NEWSOM
VIRGIL SNYDER
MARIE J. WEISS

THE AMERICAN MATHEMATICAL MONTHLY, FOUNDED IN 1894 BY BENJAMIN F. FINKEL, WAS PUBLISHED BY HIM UNTIL 1913. FROM 1913 TO 1916 IT WAS OWNED AND PUBLISHED BY REPRESENTATIVES OF FOURTEEN UNIVERSITIES AND COLLEGES IN THE MIDDLE WEST

VOLUME 51

1944

PUBLISHED BY THE ASSOCIATION
MENASHA, WIS., AND CHICAGO, ILL.

R v.51 1944

Tech

CURVES AND SURFACES*

J. W. T. YOUNGS, Purdue University

1. Opening remarks. It is difficult to imagine a title more deceptive than the one chosen for this discussion, and yet the choice is necessary since no other phrase describes precisely the content of this paper.

A primary source of confusion is the fact that the words curve and surface have been used in the literature in many different ways. For example, one meaning which has been assigned to these terms has been considered in an elegant expository paper by Whyburn [1]† entitled "What is a curve?" But the curves of Whyburn's paper are sets of points, and whatever the curves of this discussion are, they are not point sets. This last phrase reads like a printer's error, but it is made deliberately. What then is the word curve or surface to mean if not some sort of a point set? And this brings us to a second difficulty.

There is exhibited in the literature a singular reluctance towards defining these terms explicitly. One can search in vain for an explicit definition of curve and surface in the standard texts. The definition to be presented here is not the creation of a single mind; it has evolved through the years.

2. The minimum objective. These opening remarks serve to indicate the minimum objective of this paper. It is to present as clear and precise a definition of curve and surface as possible. One has a right to expect no less, but in this case I do not mean by a minimum objective a minor one, for we shall see that having obtained a precise definition of these concepts we hold a salient far into the theory of curves and surfaces.

The paper is planned therefore to have three parts. The first (§1–§8) will be devoted to defining the fundamental terms while the other two portions (§9–§18 and §19–§23) will deal with the analytic and topological applications. I hope it can be said that the first part is readily accessible even to undergraduates, for in this part I make no attempt to appeal to the experts. To make up for this the last two parts contain problems which might be of interest to all. They certainly contain problems which have yet to be solved.

3. The map. But more of this later. For the present, let A denote a metric space and suppose $f(a)=b$ is a continuous transformation from A into another metric space. This generality is not introduced to confuse and if it seems preferable it is perfectly proper to think of A as the unit interval and the transformation as a triple of continuous functions

$$\begin{aligned} x &= x(u) \\ y &= y(u) \qquad 0 \leqq u \leqq 1. \\ z &= z(u) \end{aligned} \tag{1}$$

* An address delivered at the annual meeting of the Mathematical Association of America in New Brunswick, New Jersey, on September 11, 1943.

† Numbers in brackets refer to the bibliography at the end of the paper.

Or one may think of A as the unit square and the transformation as a triple of continuous functions:

$$(2)\qquad \begin{aligned} x &= x(u, v), \\ y &= y(u, v), \\ z &= z(u, v), \end{aligned} \qquad \begin{aligned} &0 \leqq u \leqq 1, \\ &0 \leqq v \leqq 1, \end{aligned}$$

But however one thinks of A, if B is the graph of the transformation—that is, the image of A under f—it is convenient to write $f(A) = B$ and say that f is a map (or mapping) from A onto B.

4. Equivalence. An indication can now be given as to the definition of a curve or surface. A curve or surface is a *class* of such maps, in fact, an *equivalence class* of such maps. Here again, as happens so often, the concept of an equivalence plays a fundamental role. It cannot be dismissed with a cursory mention.

Given a collection $\mathcal{J}$ of elements f and a relation $\sim$ over $\mathcal{J}$, the relation is an equivalence if it is reflexive ($f \sim f$ for any element f), symmetric ($f_1 \sim f_2$ implies $f_2 \sim f_1$) and transitive ($f_1 \sim f_2$ and $f_2 \sim f_3$ imply $f_1 \sim f_3$).

One might think it inadvisable to spend any time on so elementary a concept and yet I do so without apology since it is precisely the concept of an equivalence which clinches the definition of curve and surface, and surprisingly enough, has only recently been mentioned in the literature.

Let us therefore pause for an illustration. Suppose that the collection $\mathcal{J}$ is the collection of members of the Association. Further, suppose that member f_1 is called equivalent to member f_2 if the surname of f_1 has the same number of letters as the surname of f_2. It is an easy matter to see that this is an equivalence relation over the Association.

But it is really what an equivalence relation does to a collection that is important, for it partitions the collection into mutually exclusive classes. Each class is generated as follows. The element f_1 generates a class $[f_1]$ which consists of all the elements f which are equivalent to f_1. It follows that $f_1 \in [f_1]$‡ and if $f_1 \sim f_2$ then $[f_1] = [f_2]$.

Perhaps this "curdling" into mutually exclusive classes can be observed best by referring again to our example. Each member of the Association generates an equivalence class; namely, the class of all those members whose surnames have the same number of letters as his own. Each member is in the class he generates and two equivalent members generate the same class. For convenience we can name these equivalence classes the five-letter class, the six-letter class, in general the n-letter class.

In precisely the same fashion the collection $\mathcal{J}$ of maps f will be divided into equivalence classes. Some of these equivalence classes will be called curves, others surfaces, just as an n-letter class of the preceding paragraph might be called *short* if $n \leqq 5$ and *long* if $n \geqq 10$.

‡ The notation is to be read f_1 is a member of the class $[f_1]$.

5. The equivalence relation. It remains but to choose the equivalence relation one wishes to employ. It is clear that the words curve and surface will have meaning relative to some equivalence relation. For example it can be argued that the relation used by Lebesgue—though these ideas are only implied by his work—is the following.

$f_1(A_1) \sim f_2(A_2)$ if and only if there is a topological§ transformation $T(A_1) = A_2$ such that $f_1(a_1) = f_2(T(a_1))$ for every a_1 in A_1.

This definition has the advantage of extreme simplicity. Perhaps the most pleasing feature is the fact that, given one map, it is easy to get all the others which are equivalent to it. For if $f_1(A_1)$ is a given map, the map $f_2(A_2) = f_1(T(A_2))$ is equivalent to it for any topological transformation $T(A_2) = A_1$, and further, any map equivalent to $f_1(A_1)$ can be so obtained. In spite of this tremendous advantage this notion of equivalence is no longer used, principally because it is difficult to get a satisfactory concept of *distance* between equivalence classes.

Admirably suited to this last purpose is a notion of equivalence due to Fréchet.‖

$f_1(A_1) \sim f_2(A_2)$ if and only if there is, for every $\epsilon > 0$ a topological transformation $T_\epsilon(A_1) = A_2$ such that $\rho\{f_1(a_1), f_2(T_\epsilon(a_1))\} < \epsilon$ for every a_1 in A_1.¶

For the present let us not be worried as to what this descriptive definition means from a constructive point of view. No one knows the complete answer to this, but roughly speaking, the relation demands that the maps can be matched as closely as we please through the medium of a topological transformation.

Now consider the collection $\mathfrak{F}$ of maps f. Any map f_1 generates a Fréchet equivalence class $[f_1]$ consisting of all maps Fréchet equivalent to $[f_1]$. Any map is a member of the Fréchet equivalence class it generates, and two Fréchet equivalent maps generate, of course, the same Fréchet equivalence class. Any map in a class will be said to *represent* the class or be a *representation* of it.

6. The definitions. The crucial point is that if two maps $f_1(A_1)$ and $f_2(A_2)$ are in the same Fréchet equivalence class $[f]$ then the definition requires that the base spaces A_1 and A_2 be the same from the point of view of topology. Thus we may classify the equivalence classes in terms of the topological character of the base space. *It is now possible to define curve and surface.*

§ A transformation $T(A_1) = A_2$ is topological if it is biunique and bi-continuous. That is, if in addition to the fact that with each a_1 of A_1 there is associated a single a_2 of A_2 it is true that with each a_2 of A_2 there is exactly one a_1 of A_1 such that $T(a_1) = a_2$. Thus there must exist an *inverse* transformation which is denoted by $T^{-1}(A_2) = A_1$. The bi-continuity condition demands that $T^{-1}(A_2) = A_1$ as well as $T(A_1) = A_2$ be continuous.

It is necessary to prove that the relation of Lebesgue is indeed an equivalence. *Reflexivity* follows from the fact that the transformation $T(a_1) = a_1$ is a topological map of A_1 onto itself: *symmetry* from the fact that the inverse of a topological map is topological: *transitivity* from the fact that a topological map followed by a topological map defines a transformation which is topological.

‖ An important equivalence, due to McShane [1], requires, in addition, that the degree of the mapping T_ϵ be $+1$. This has meaning, of course only for special types of spaces. See also Radó [1].

¶ See footnote §. The notation $\rho\{a, b\}$ means the distance from a to b.

Consider a class $[f]$ with a base space A. Then $[f]$ will be called a *curve* or *surface* depending on the topological character of A. If A is, topologically speaking, a *closed segment*, then $[f]$ is called a *curve*, more specifically a *curve of the type of a closed segment*. If A is the circumference of a circle, then $[f]$ is called a *curve of the type of a circle*. On the other hand, if A is, topologically speaking, a closed square, then $[f]$ is called a *surface*, more specifically, a *surface of the type of a closed square*. If A is a sphere, then $[f]$ is called a *surface of the type of a sphere*.

7. Specialization. In this discussion we shall deal exclusively with curves of the type of a closed segment and surfaces of the type of a closed square and so refrain from pursuing a digression which might be both pleasant and profitable. In fact, we shall go further in this anti-generalization movement and for the sake of expository clarity consider only mappings into Euclidean 3-space and these only of the special forms (1) and (2) already tabulated.

That is, if we now speak of a map $f(A)=B$ it is automatically understood to be of form (1) or (2). If of form (1) the Fréchet equivalence class it generates is called a curve, if of form (2) the Fréchet equivalence class it generates is called a surface.

8. Historical comment. It is well to notice a sort of historical inevitability in the development of the definition. Consider for example the fact that no doubt a surface was first conceived of as a point set; a plane, a sphere or a cylinder. Topologists branched off at this point with two dimensional manifolds, but analysis began to think of a surface in terms of its description, it was thought of as a triple of continuous functions of the second type. On the other hand, certain pairs of triples were said to describe, or define, or represent the same surface. We have finally come to the place where the loose concept "describing the same surface" has been made rigorous through the notion of Fréchet equivalence and the equivalence classes so obtained are called surfaces.

9. The problems. Having spent this time in clarification of concepts it is gratifying to observe that the momentum acquired carries us naturally towards two objectives. Since we speak of curves and surfaces, can we in some manner speak of length and area? On the other hand, since the subject matter of this paper has been revealed as the study of Fréchet equivalence classes of maps, what can be said of the structure of these classes? The first will be called the *analytic*, the second the *topological* problem.

The analytic problem will be considered first, and a good many of the statements will be made for surfaces only. Many of the details will be omitted since it is the purpose of the last two sections of the paper to indicate merely the spirit of the theory.

10. Polyhedra. A mapping $p(A)=B$ is called quasi-linear (the terminology is due to McShane [1]) if A can be decomposed into a finite number of triangles $\Delta_1, \cdots, \Delta_n$ on each of which the coordinate functions x, y, and z are linear in u and v.

Now $p(\Delta_k)$, the image of Δ_k is a triangle in 3-space which in special cases, it is true, may reduce to a segment or a single point. Without exception, however, it is possible to speak of the area of $p(\Delta_k)$, *an* area which may be zero, and to designate it by $E(p(\Delta_k))$. Let $E(p)=\sum_{k=1}^{n}E(p(\Delta_k))$ be called the *elementary area* of the map p.

In the event a surface $[f]$ has a quasi-linear representation p it will be called a *polyhedron* and designated by $[p]$. The collection of polyhedra is fundamental in what follows.

11. Elementary area. It is perhaps worth noting that a polyhedron will certainly have representations which are not quasi-linear. In fact, a polyhedron will have more than one quasi-linear representation. But, if p_1 and p_2 are two quasi-linear representations of the same polyhedron $[p]$ then it can be shown that $E(p_1)=E(p_2)$. This justifies speaking of this common value as the *elementary area* of the polyhedron and designating it by $E([p])$. Notice that we have gone from a function of a map to a function of an equivalence class of maps. We have, in fact, defined an area for certain surfaces. To extend the definition to all surfaces we need the concept of *distance.*

12. Distance. If $f_1(A)$ and $f_2(A)$ are two maps then there is, for any fixed value a in A, the ordinary Euclidean distance from $f_1(a)$ to $f_2(a)$. Denote it by $|f_1(a)-f_2(a)|$. In a sense, this number measures the deviation of f_1 from f_2 at a. It is natural to say that the deviation of f_1 from f_2 over A is $\max|f_1(a)-f_2(a)| = d(f_1, f_2)$, where the maximum is taken for all $a\in A$. In fact, it is but the matter of a moment to see that this deviation is a bona fide metric over the collection of maps $f(A)$. In other words, this deviation is a non-negative, symmetric function of two maps which is zero if and only if the maps are identical, and the triangle inequality is satisfied. It remains only to assign meaning to the phrase, *distance from the class* $[f_1]$ *to the class* $[f_2]$. Each member of $[f_1]$ has a deviation or distance from each member of $[f_2]$. Nothing could be more natural than to say that the distance from $[f_1]$ to $[f_2]$ will mean the infimum of such deviations. Explicitly $\rho\{[f_1], [f_2]\}=\inf d(f_1^*, f_2^*)$ where the infimum is taken over all $f_1^*\in[f_1]$, and all $f_2^*\in[f_2]$.

This is a metric over the set of equivalence classes $[f]$.

13. Density. Let us make an immediate application of this concept. Suppose $[f]$ is any surface and $f(A)=B$ is one of the representations. Subdivide the square A into n^2 congruent squares and then in each of these draw the diagonal with slope 1. The square A is now decomposed into $2n^2$ congruent triangles. Let Δ be the typical triangle with vertices a_1, a_2, a_3. Consider the points $f(a_1)$, $f(a_2)$, $f(a_3)$. These determine a possibly degenerate triangle Δ^* in 3-space. Let $p(\Delta)$ be the unique linear map from Δ to Δ^*. The map $p_n(A)=B$ which agrees with $p(\Delta)$ on Δ for each Δ can be seen to be quasi-linear. Hence p is a representation of a polyhedron $[p]$. From the uniform continuity of f it follows that p_n converges uniformly to f over A, hence the distance from $[p_n]$ to $[f]$ converges

to zero. We say that $[p_n]$ converges to $[f]$, and use the notation $[p_n] \to [f]$.

What has been shown is that, given any surface $[f]$, there is a sequence of polyhedra $[p_n]$ such that $[p_n] \to [f]$. Each of the polyhedra we have defined is said to be *inscribed* in the surface. It should be mentioned that there are sequences of polyhedra converging to the surface such that none of the polyhedra is inscribed—but more of this later.

14. Area. In view of the convergence of the polyhedra it is a natural inclination to feel that $\lim E([p_n])$ exists. If it does, then the limit should certainly be called the area of $[f]$. Some sixty years ago, in a letter of Genocchi, Schwartz showed that this was not the case even for the simplest possible surfaces. On the other hand $\underline{\lim}\, E([p_n])$ does exist though it depends, of course, on the particular sequence of polyhedra chosen. (The limit may be infinite.) To hurdle the obstacle presented by the example of Schwartz, Lebesgue [1], some twenty years later, considered $\inf \underline{\lim}\, E([p_n])$ where the infimum is taken for all sequences of polyhedra (whether inscribed or not) which converge to $[f]$. This number, possibly infinite, certainly depends only on the equivalence class $[f]$. This number is the celebrated Lebesgue area of the surface $[f]$.

An immediate question arises. The Lebesgue area of the surface $[f]$, denoted by $L([f])$, is defined for any surface $[f]$. If the surface is a polyhedron, how does the Lebesgue area compare with the elementary area? One of the important theorems of the theory, and of course the theorem which makes the whole theory useful, is that the two are equal. This fact enables us to speak of the Lebesgue area as an *extension* of the elementary area.

15. Problem of Geöcze. In the definition of Lebesgue the approximating polyhedra are not necessarily inscribed. If we insist that each polyhedron of the sequence be inscribed in the surface the collection of available sequences is decreased and so the new infimum would certainly be no smaller than the old one. If we denote the new infimum by $\bar{L}([f])$ then it is a conjecture of the Hungarian mathematician de Geöcze that $\bar{L}([f]) = L([f])$. For recent developments along this line one should read Radó [3] and Huskey [1].

16. Length. To return to the definition of *area*, it is clear that in precisely the same way it is possible to define the Lebesgue *length of a curve* $[f]$. We use the same notation $L([f])$. No confusion can arise since in each case we state the character of the equivalence class $[f]$. For curves the de Geöcze conjecture is true.

17. Formulas. Let us halt the development of the theory at this stage to review some of the facts presented in most undergraduate courses on this topic.

You will recall that, in the elementary texts, if a map is given by a triple of type (1) then the map or its graph, there is usually some doubt, is called a curve and its length is given by an integral formula $I(f) = \int_0^1 [x'^2 + y'^2 + z'^2]^{1/2} du$. On the other hand, if a map is given by a triple of type (2) then the map or its graph, again there is some doubt, is called a surface, and its area is given by the

integral formula $I(f)=\int_0^1\int_0^1[X^2+Y^2+Z^2]^{1/2}dudv$, where X, Y and Z are the usual Jacobians.

It is, I believe, a fair test of an advanced theory to ask how well it deals with the naive, the freshman problems. At any rate, matching the Lebesgue theory to these integral formulas constitutes one of the most fascinating problems in the theory—and one which is by no means completely solved.

It is clear, of course, that the first mapping is, from our point of view merely a *particular representation* of a curve; the second mapping merely a *particular representation* of a surface. It is equally clear that the formulas may be meaningless because the derivatives may not exist. It is therefore extremely unlikely that the integral formulas, when applied to a particular member of an equivalence class, should give the Lebesgue length or area of that equivalence class. In fact, it is more than unlikely, it is definitely false. On the other hand some startling things are true.

Suppose we have a triple f representing a curve $[f]$. A classical theorem [Saks 1] states that:

(1) $L([f])<\infty$ if and only if f is of bounded variation; that is, if and only if each coordinate function is of bounded variation. Hence it is possible to determine conclusively if a curve is of finite length or not simply by examining any one of its representations. Nothing like this is known for surfaces.

Further, if $L([f])<\infty$, then

(2) The integral formula has meaning for every representation and $I(f)\leqq L([f])$.**

(3) The sign of equality holds if and only if f is absolutely continuous; that is, if and only if each of the coordinate functions is absolutely continuous.

(4) There is always a particular representation f^* such that $I(f^*)=L([f])$.

In comparison with these facts for curves the latest results for surfaces are those of Radó [1]:

(1) If a surface $[f]$ has a representation f^* for which $I(f^*)$ is finite then $I(f^*)\leqq L([f])$.

(2) The sign of equality holds if and only if there is a sequence of polyhedra $[p_n]\to[f]$ such that $E([p_n])\to I(f^*)$.

18. Curves vs. surfaces. Those who are unfamiliar with the field will perhaps be astonished at the fact that for two types of equivalence classes of maps so similar as to definition the results should be so different. It appears that the theory for curves is relatively simple principally because there is a systematic process whereby one can obtain a polygon close to a given curve but not longer than the curve. Nothing similar has been done for surfaces.

As a matter of fact, if $[f]$ is a *curve* and $[p]$ an inscribed polygon, then $L([p])\leqq L([f])$. The corresponding inequality for surfaces does not hold. This is, indeed, the source of the previously mentioned example of Schwartz. The result should not have been as astonishing to mathematicians as it appears to have

** The integrals are to be taken now in the sense of Lebesgue.

been, though it is all too easy to make such an observation after the event. There is a fundamental difference between inscribed polygons and inscribed polyhedra, neither of which, one will notice, has been yet defined explicitly.

In view of the historical importance of this difference a slight digression may now be permitted.

A polygon $[p]$ is said to be *inscribed in a curve* $[f]$ if there is a representation f of $[f]$ and a quasi-linear representation p of $[p]$ such that on each of the intervals $\Delta_1, \cdots, \Delta_n$ of the decomposition of A required in the definition of p, it is true that $f=p$ on the frontier of Δ_k (notation $F(\Delta_k)$) for each k.

Suppose we make the corresponding statement for surfaces. A polyhedron $[p]$ is said to be *inscribed in a surface* $[f]$ if there is a representation f of $[f]$ and a quasi-linear representation p of $[p]$ such that on each of the triangles $\Delta_1, \cdots, \Delta_n$ of the decomposition of A required in the definition of p, it is true that $f=p$ on the frontier of Δ_k for each k.

This statement is of course the sheerest nonsense since it requires two conditions to be satisfied which are, in general, mutually incompatible. On Δ_k the map p is supposed to be linear which implies that the image of $F(\Delta_k)$ is the boundary of a triangle (possibly degenerate); at the same time p is supposed to agree with the map of f on $F(\Delta_k)$, and the map of f on this set may be incredibly complicated.

Actually an inscribed polyhedron is defined by making a tremendous modification in the last condition. It is required merely that $f=p$ at *three* points; namely, the *vertices* of $\Delta_k (k=1, \cdots, n)$.

It should not be astonishing then that for a surface $[f]$ and an inscribed polyhedron $[p]$ instead of $L([p]) \leqq L([f])$ we usually have $L([p]) > L([f])$.

For curves the ideal character of inscribed polygons can be seen almost at once. Let A be the unit interval and consider a decomposition $D: \Delta_1, \cdots, \Delta_n$. Suppose $\mu(\bar{D})$ is any mapping of $\bar{D}=\sum_1^n F(\Delta_k)$ into 3-space and $f(A)$ is a map such that $f(a)=\mu(a)$, for $a \in \bar{D}$. In this case the curve $[f]$ is said to be *supported by the network* $\mu(\bar{D})$.

Consider the diameter of $\mu(F(\Delta_k))$, denoting it by $\delta(\mu, \Delta_k)$. The number $\sum_1^n \delta(\mu, \Delta_k)$ is of fundamental importance, for no matter what curve is supported by $\mu(\bar{D})$, and no matter how "length" is defined, it is clear that the "length" of the curve should be no less than $\sum_1^n \delta(\mu, \Delta_k)$. This leads at once to the fact that an inscribed polygon is no longer (in the sense of Lebesgue) than the curve in which it is inscribed, since the curve is supported by a network of vertices of the polygon.

How is the case with surfaces? The statements of the penultimate paragraph can be reproduced word for word.

So far so good, but what notion is now to replace the diameter of a set so that analogous statements can be made throughout? There is an obvious danger in over simplification, but from one point of view it can be said that completing this analogy was the end towards which de Geöcze directed his efforts. Tremendous strides in this direction have been taken by Radó [4] and [5] and Reichelder-

fer [2], culminating in the elegant definition of an "essential area" by Reichelderfer [1]. The Lebesgue approach certainly does not supply an analogy.

19. The need for topology. In the course of comments in §17 it will have been noticed that some of the statements depend upon a particular representation of the equivalence class while others are independent of the representation. This makes it all the more important to investigate the structure of these classes, a study which has interested Kerékjártó [1 and 2], Morrey [1 and 2], Morse [1], and Tompkins [1].

20. Topological problems. This portion of the paper will be considered in two parts each of which suggests itself on a brief examination of the facts. Whenever one has a class of objects it is interesting to know something about properties which are enjoyed by every member of the class. Such properties are called *invariant*. On the other hand, there are always properties which are not invariant, and this makes it possible to say that some members of the class are better, with respect to a certain property, than others, for some members will possess a property not common to all. In the search for these good members it would naturally be useful to have a *constructive process* whereby one could obtain other members of a class of which one representation is known.

The *problem of invariants* is considered first and then the *problem of representations*.

21. Invariants. One invariant has already been mentioned since it has been observed, for curves, that if a single member of the equivalence class is of bounded variation, then every member has this property.

A simple and interesting invariant is the graph. A map $f(A)=B$ has a graph B which is also the graph of all the maps which are Fréchet equivalent to f. Hence B is invariant and may be called the graph of the equivalence class $[f]$.

But the graph of an equivalence class gives absolutely no indication as to the character of the class; for we have the somewhat astonishing fact that *every graph of a curve is also the graph of some surface, and conversely*. This simply serves to highlight an early statement that a curve or surface is not a point set.

As a matter of fact, any Peano space in 3-space is the graph of some curve and so also the graph of some surface. This leads to such peculiarities as a curve or surface whose graph fills out a cube.

Very well, one will say, the graph of an equivalence class gives no clue as to whether the equivalence class is a curve or a surface, but surely the graph is important in matters of length and area. The facts do not support this reasonable conjecture, for it is true, on the contrary, that *any graph is the graph of some surface of zero area*.

A final invariant can be described only after a somewhat technical discussion. The reader is here invited to consult Whyburn [2]. The map $f(A)=B$ induces a decomposition of the set A. For each point $b\in B$ there is an inverse set $f^{-1}(b)$ in A consisting of the totality of points which are mapped onto b. The set $f^{-1}(b)$ will not be connected in general. Let α be the notation for a component of

$f^{-1}(b)$, and use $\sum$ to denote the totality of α's. Each $a \in A$ is in exactly one α, so we may define a single valued association $m(a)=\alpha$ to mean $a \in \alpha$. The important thing is that the set $\sum$ can be topologized in such a way that $m(a)=\alpha$ is a continuous map. Moreover it is clearly monotone; that is, each inverse set is connected.

The abstract space $\sum$ can be thought of as the graph of the monotone part of $f(A)$. *This graph is invariant.* The statement should be interpreted to mean that if $f_1(A)$ is Fréchet equivalent to $f_2(A)$ and $\sum_1$ and $\sum_2$ are the corresponding abstract spaces, then there is a topological transformation $T(\sum_1)=\sum_2$.

22. Representations. As previously noted, the fact that not all properties are invariant brings us to the question of representations. This is the problem of constructing other members of an equivalence class of which one representation is at hand.

Suppose that $f(A)=B$ is a known representation of a class $[f]$. Then $g(A)=f(T(A))$ is a member of the class $[f]$ for any topological transformation $T(A)=A$. This is obvious on looking at the definition, for the topological transformation required for Fréchet equivalence is precisely the above T regardless of the size of ϵ.

A somewhat more sophisticated construction is the following. A map $g(A)=f(m(A))$ is a member of the class $[f]$ for any monotone map $m(A)=A$. This construction does not, however, yield all the members of the class f though its implications are not without interest.

Let me add that the interest in monotoneity does not end here. It has been shown that with every map $f(A)=B$ there is associated a monotone map $m(A)=\sum$. In fact, the space $\sum$ is associated with the equivalence class $[f]$, and whereas in this never-never land the graph of $[f]$ has very little to do with the length or area of the equivalence class $[f]$, the space $\sum$ which is the graph of m has a considerable say in the matter.

If $[f]$ is a curve, its length is zero if and only if $\sum$ is a single point. This theorem is obvious, but for surfaces there is the truly magnificent theorem of Morrey [2] and Radó [2]. The area of the surface $[f]$ is zero if and only if $\sum$ is a tree. (A tree, or dendrite, is a special type of Peano space which has a "slender" structure).

23. Deformations. A discussion of the problem of representations would not be complete without mentioning the work of Morse [1] and Tompkins [1] on deformations.

Suppose that for each t, $0 \leqq t \leqq 1$, there is a map $f(a, t)$ of the unit segment $0 \leqq a \leqq 1$. Suppose, further, that $f(a, t)$ is continuous in both a and t. In other words, if $a_n \to a$ and $t_n \to t$, then $f(a_n, t_n) \to f(a, t)$. In this case $f(a, t)$ is called a *homotopy* and the map $f(a, 0)$ is said to be *homotopic* to the map $f(a, 1)$. For each t, $0 \leqq t \leqq 1$, the map $f(a, t)$ is a representation of some curve $[g_t]$. The continuity condition guarantees that if $\tau \to t$, then $[g_\tau] \to [g_t]$. The converse question is this: Suppose we have a class of curves $[g_t]$ for each t, $0 \leqq t \leqq 1$; and suppose

that if $\tau \to t$, then $[g_\tau] \to [g_t]$. Is it possible to choose a representation $f(a, t)$, $0 \leqq a \leqq 1$, of $[g_t]$ for each t such that $f(a, t)$ is continuous in both variables?

The answer to this question is in the affirmative as has been shown by Morse [1]. Tompkins [1] extends this result to curves of the type of a circle.

In the course of his discussion, Morse shows that, for any curve $[f]$ there is a master representation $\phi(A) = B$, having the property that for any representation $g(A) = B$ of $[f]$ there is a monotone map $m(A) = A$ such that $g(a) = \phi(m(a))$ for each a in A.

Steenrod has asked about similar theorems for surfaces. Not much is known here, though it will be proved elsewhere that there is no such thing as a master representation for surfaces. Since this is of essential use in the argument employed in the homotopy result one is tempted to conjecture that the theorems do not carry over. At any rate we have here an unsolved problem to add to the spectrum of questions still open for investigation.

BIBLIOGRAPHY

Fréchet, M. [1] Sur la distance de deux surfaces. Annales de la Société Polonaise de Mathématique, v. 3, 1924, pp. 4–19.

Huskey, Harry D. [1] Contributions to the problem of Geöcze. Duke Mathematical Journal, v. 10, 1943, pp. 249–257.

Kerékjártó, B. [1] Involutions et surfaces continues I, Acta Szeged, v. 3, 1927, pp. 49–67.

[2] Involutions et surfaces continues II, Acta Szeged, v. 3, 1927, pp. 242–249.

Lebesgue, H. [1] Intégrale, Longueur, Aire. Annali di Matematica Pura ed Applicata, v. 7, 1902, pp. 231–359.

McShane, E. J. [1] On the semi-continuity of double integrals in the calculus of variations. Annals of Mathematics, v. 33, 1932, pp. 460–484.

Morrey, C. B. [1] The topology of (path) surfaces. American Journal of Mathematics, v. 57, 1935, pp. 17–50.

[2] An analytic characterization of surfaces of finite Lebesgue area, II. American Journal of Mathematics, v. 58, 1936, pp. 313–322.

Morse, Marston. [1] A special parametrization of curves. Bulletin of the American Mathematical Society, v. 42, 1936, pp. 915–922.

Radó, Tibor. [1] On the semi-continuity of double integrals in parametric form. Transactions of the American Mathematical Society, v. 51, 1942, pp. 336–361.

[2] On continuous path-surfaces of zero area. Annals of Mathematics, v. 44, 1943, pp. 173–191.

[3] On a problem of Geöcze. American Journal of Mathematics, v. 65, 1943, pp. 361–381.

[4] On absolutely continuous transformations in the plane. Duke Mathematical Journal, v. 4, 1938, pp. 189–221.

[5] With Reichelderfer, P. A theory of absolutely continuous transformations in the plane. Transactions of the American Mathematical Society, v. 49, 1941, pp. 258–307.

Reichelderfer, P. [1] On bounded variation and absolute continuity for representations of continuous surfaces. Transactions of the American Mathematical Society, v. 53, 1943, pp. 251–291.

[2] With Radó, Tibor. See Radó [5].

Saks, S. [1] Theory of the Integral, Warsaw, 1937.

Tompkins, C. [1] Fréchet deformations and homotopy. Annals of Mathematics, v. 40, 1939, pp. 392–399.

Whyburn, G. T. [1] What is a curve? This MONTHLY, v. 49, 1942, pp. 493–497.

[2] Analytic Topology, American Mathematical Society, Colloquium Publication, v. 28, 1942.

MATHEMATICS TEXTBOOKS FOR THE INTRODUCTORY COLLEGE COURSES*

H. P. EVANS, University of Wisconsin

1. Introduction. The accelerated production of elementary books on college mathematics during the past few years raises a number of questions concerning the mathematical curriculum and bears indirectly on larger questions concerning the aims of mathematical education. Perhaps the textbook plays too great a role in our elementary courses, but it does seem to be true that the teaching of mathematics is influenced to a considerable extent by the character of the available textbooks. By way of examples, the content of the course in the theory of equations as given in the majority of our colleges has been determined to a large extent by Dickson's First Course, and the spirit in which the calculus has been taught in this country for many years has been influenced greatly by Granville's Calculus and several similar books. One wonders how many of the more recent books are destined to play similarly significant roles in mathematical education.

Certainly the bewildering array of survey texts, basic texts, unified texts, brief texts, comprehensive texts, *etc.*, leads to an embarrassment of riches for the instructor who is responsible for selecting a book for a particular course or purpose. The situation becomes even worse when one is confronted with the tidal wave of war course books relating to navigation, map making, artillery fire, training for pilots, *etc.* These books no doubt have their proper place, but it is unlikely that courses based on them will have a permanent place in the undergraduate curriculum in mathematics. In this connection it is of interest that both the Navy V-12 and the AST programs in mathematics stress, with slight variations, topics which have been considered standard in elementary collegiate courses for many years.

If we assume that, for the most part, the content of the standard courses up to and including the calculus is essentially fixed, much latitude remains with regard to the interweaving of the various topics, the degree of rigor, and the style of presentation. The textbook writers have been thoroughly cognizant of all of these possibilities, and the resulting multiplicity of treatments, to say nothing of the various permutations and combinations of topics, is becoming somewhat appalling. It is proposed here to discuss briefly some of these trends in their relation to the curriculum and to the larger question of the purpose of mathematical education.

2. The general course. There is much difference of opinion as to what constitutes the most desirable course for the general student who, presumably, will elect but one year of mathematics. The question as to the most desirable type of course for such students is a moot one and the textbooks reflect a diversity of opinions. If quantity of production is the criterion the conclusion is

* Presented at the meeting of the Mathematical Association of America at Chicago, Illinois, November 28, 1943.

inescapable that the traditional separate courses in college alegbra, trigonometry, and analytic geometry are to be preferred. A number of writers, however, contend that there is much to be gained by a unification and interweaving of these topics into a single course. Still others believe that the elements of calculus should be introduced, but there seems to be a considerable difference of opinion as to the amount of calculus which should be included in such a course. Then there is the survey-type text which scans the gamut of graduate and undergraduate work in mathematics, emphasizing fundamental concepts, cultural aspects, and historical background, but excluding much of the traditional drill work. Although some of these books are admirable, it is believed that their greatest value is to supplement rather than to replace books of a more conventional type.

Some of the survey-type books invite the neophyte to retread the more or less familiar ground of his high school algebra but to use a postulational approach in order that he may see the reasons underlying the rules of the operations. Then additional applications may be made, as for example, to the algebra of sets or to various kinds of geometries. Historical incidents and applications of various kinds are discussed in order that the student may better appreciate the significance of mathematics in a broader sense. In such a course few direct demands are made on the students' previous training in mathematics and but little time is devoted to the development of the techniques which are necessary for further work in mathematics. This last consideration is a very important one in view of the fact that many entering freshmen expect to take but one year of mathematics and later, through choice or necessity, take additional courses in the subject.

It should not be necessary for a college course in mathematics to offer an apology for requiring as prerequisite the elements of plane geometry and a knowledge of algebra through the simpler types of quadratic equations, although it is recognized that many colleges must of necessity admit students who do not have this minimum preparation. The beginning course in mathematics for such students should be primarily a remedial course and if a postulational approach to elementary algebra provides the most efficient means for enabling the student to overcome the handicap of a poor preparation then this method should certainly not be neglected. The survey-type books are not designed for the brief remedial course in elementary algebra which should be the most vital concern of poorly prepared students. The twin objectives of preparing a student for further work in mathematics and of giving him some appreciation of the values of the subject in a year course are believed not to be inconsistent. For the poorly prepared student a considerable amount of drill work in connection with a review of elementary algebra appears unavoidable if a permanent handicap in mathematics is to be precluded, but material which is new and significant to the student should be introduced as early as is feasible. Certainly the well prepared student should be introduced to new and undiluted material almost from the start if his interest in mathematics is to continue to develop.

At risk of being trite we reaffirm the tenet that the first collegiate course in mathematics should aim to acquaint all students of the subject with the nature of precise mathematical definitions and proofs of theorems and, also, to help them to acquire those basic skills without which further work in either mathematics or its applications would be unthinkable. The purpose of the course should not be to entertain the student, or to impress him with the diverse applications of mathematics, or to attempt to increase the popularity of the subject by watering it down so as to make it easy for the indolent to grasp. It seems entirely possible that many of the brilliant men and women who have avoided mathematics after their first year in college have done so because of a lack of interest in a diluted first course which consisted largely of an embellishment of their high school work in the subject. Diverse applications, historical background (if not confined to mere footnotes), *etc.*, undoubtedly add interest to the course, but they are of secondary importance, even as motivating influences, as compared with precision of definitions and clearness and elegance of proofs. And yet a cursory examination of a number of recent books of various types revealed that some authors were more concerned with rearranging subject matter, adding historical data, increasing the number of applications, *etc.*, than in avoiding the perpetration of unsatisfactory definitions, incomplete statements of theorems, and clumsy proofs. Fortunately there are notable exceptions, and within the last few years excellent books in almost all of the afore-mentioned categories have appeared.

In the light of the foregoing discussion, and for other reasons, it seems erroneous to assume that different groups of students with the same mathematical preparation should have different types of beginning courses in college mathematics. Naturally this conclusion is not applicable to terminal courses which are required for some specific professional preparation, as, for example, the mathematical theory of investment.

3. Courses in college algebra and trigonometry. College algebra, or a combination of college algebra and trigonometry, is perhaps the most commonly offered introductory course in college mathematics. In the case of college algebra the pattern of the course reveals a rapid succession of heterogeneous topics such as quadratic functions and equations, progressions, the binomial theorem, inequalities, complex numbers, logarithms, theory of equations, ratio and variation, permutations and combinations, determinants, *etc.* It has been pointed out by several writers that college algebra, as commonly presented, is the most heterogeneous of all the subjects constituting elementary college mathematics. Although a remedy for this state of affairs was proposed by G. A. Bliss* as early as 1911, and an excellent book by Wilczynski and Slaught† appeared in 1916, the majority of books on college algebra continued to treat the subject as a collection of miscellaneous topics, and in many cases with little considera-

* Monographs on Topics of Modern Mathematics, edited by J. W. A. Young, page 264.
† College Algebra, with Applications, Wilczynski and Slaught.

tion given to the reasoning upon which the algebraic processes depend. The proposal by Bliss and the book referred to both place the function concept in a central position and classify the various topics in relation to the types of functions involved. While this program does not seem to have been fully carried out in books on algebra, there has been a notable increase in emphasis on functional relationships, and it is no longer uncommon to find linear and quadratic equations playing a subsidiary role to the corresponding functions. This in turn has led to a greater use of graphical representations and geometric interpretations of algebraic operations, all of which appears highly desirable in a first course in college mathematics.

The trend of recent books on college algebra, as well as the more comprehensive unified books, toward a greater emphasis on the functional viewpoint is not entirely free from criticism. Purely algebraic concepts, for example, are usually relegated to a secondary place in books of this type, despite the increasing importance of these concepts in modern algebra and in theoretical physics. The crux of the matter seems to be that there are too many important topics in algebra to be included in a beginning course of one semester's length. For definiteness let us consider a group of students who are fairly well prepared in intermediate algebra through the elements of quadratic equations, so that it will not be necessary to consider the question of remedial work in algebra. To the writer it seems that the first course for these students should (in the case of a four or five semester hour course) be a course combining algebra and trigonometry and should emphasize the functional point of view. The algebra part of the course should be quite restricted in scope and would take up linear and quadratic functions, ratio and variation, progressions, and the binomial theorem. This would leave ample time in a four or five semester hour course for a thorough treatment of the essentials of trigonometry, including that portion of the theory of logarithms needed for the computational work in trigonometry. If the course under consideration is a five semester hour course, there would be time, also, for the elements of spherical trigonometry.

During the trigonometry part of the proposed course in algebra and trigonometry polar coordinates might well be introduced in connection with the derivation of the addition formulas, following either the method proposed by E. J. McShane* or the methods used in several recent textbooks on trigonometry.† Due to the importance of these formulas another proof of them might be given at the time when oblique triangles are studied. References may be made to a recent suggestion by A. A. Albert‡ and to the section on trigonometry by H. S. White in the Encyclopaedia Britannica. The use of mathematical induction to generalize the proofs obtained by oblique triangle methods would correlate well with its previous use in the course in proving the binomial theorem.

* The addition formulas for the sine and cosine, this MONTHLY, vol. 48, 1941, page 688.

† Essentials of Trigonometry, Curtiss & Moulton. Plane and Spherical Trigonometry, Rickey & Cole.

‡ A suggestion for a simplified trigonometry, this MONTHLY, vol. 50, 1943, p. 251.

These examples are cited merely to indicate the spirit in which the writer believes the course should be taught. The instructor who feels that the topics in this proposed first course in algebra and trigonometry are of insufficient interest to the general student may find in the various survey-type books a rich mine for collateral reading assignments to whet the students' interest without detracting from the main purpose of the course.

With the exception of determinants the course in algebra and trigonometry just considered provides the necessary background for fairly complete courses in analytic geometry and elementary calculus.

Students who take a course such as the one described, and who plan to specialize in mathematics or physical science, should have a more sophisticated course in college algebra added to their curriculum. Furthermore, the traditional course in the theory of equations does not satisfy this requirement. The proposed course in college algebra could be taken in the sophomore year concurrently with the calculus, or in the junior year. It would start with the number system and develop the principles of college algebra through complex numbers from a postulational point of view and might include topics in the elementary theory of numbers such as Euclid's algorithm, the theory of partial fractions, linear dependence, and the principles of matrices necessary for the complete discussion of a system of linear equations, as well as much of the classical theory of equations preceded by a careful discussion of the division transformation and the properties of polynomials. Topics which recently have suffered notable neglect, such as the multinomial theorem, finite differences, and summation of series might well find a place in such a scheme. Several of the older books on college algebra and a few recent books are available as reference books to be used in connection with such a course.

4. The course in analytic geometry. Analytic geometry, whether given as a separate subject or scattered through a unified course, should receive the most attention in the first year of college mathematics. This is natural in view of the inherent unity of its content, the opportunity it affords for the development of both intuition and rigor, and the excellent means it provides for exploiting the students' previously gained knowledge of elementary algebra and trigonometry. Unfortunately these desiderata have been achieved only in part by some of the standard and most popular textbooks on analytic geometry. This is evidenced by failures to emphasize the meaning of the converse of a theorem, by restrictions of proofs to special cases, and by tendencies to avoid parts of the students' previous mathematical experience as, for example, the addition theorems of trigonometry. However, some of the more recent books show marked improvements over many of their predecessors in all of these directions. In particular, the tendency to make greater use of the elementary properties of determinants in both plane and solid analytic geometry is to be commended. In most textbooks on analytic geometry a knowledge of determinants gained from the college algebra course is assumed, but in some respects a better plan is to introduce the elementary properties of determinants in the course on analytic geometry

as this makes the work with determinants more meaningful from the start. This has been recognized by the authors of several recent textbooks, and it is hoped that the plan will be adopted more generally.

For the student who needs the first semester to prepare himself in algebra and trigonometry, the introductory course in analytic geometry is limited in most cases to a four or five semester hour course if he is to begin the study of calculus in the first semester of his sophomore year. For reasons previously indicated, the course in analytic geometry, if properly taught, has great educational value, and no apology is needed for giving it this amount of emphasis, notwithstanding the conglomerate variety of topics which of late have been finding their way into first year courses at its expense. Moreover, a few of the new books on analytic geometry have added to the supply of interesting problems of the type which arouse the interest of those students who are intellectually susceptible, whether their main interest is in mathematics, economics, or medicine.

A number of available books on analytic geometry are readily adaptable to a two semester course and such a program is an excellent one for the student with a good high school preparation in algebra and trigonometry. The inclusion of work in the method of least squares and curve fitting in some texts adds to interest in the course for science students without detracting from the main objectives. In fact, the method of least squares provides a natural application of previous results on quadratic functions, while the graphs of the power function and exponential function using logarithmic and semi-logarithmic scales, respectively, follow naturally from the students' previous study of the graphs of these functions using uniform scales. Another trend in a two semester course is to introduce the elements of calculus in connection with the course in analytic geometry. This varies from the practice of introducing the derivative exclusively for the purpose of studying tangents and normals to conics, to the other extreme where the differentiation of algebraic functions is presented in considerable detail and applications are made to maxima and minima problems, to time rates of change, to curve tracing, *etc.* Some writers, especially of the so-called unified texts, seem to have emphasized these applications at the expense of the underlying theory of limits, a procedure which seems deplorable even though there are those who maintain that students should be shielded from precise definitions and proofs of theorems involving limits and continuity until they have completed a year's work in the calculus.

5. The course in calculus. The more or less popular belief that the first course in the calculus should deal almost entirely with formal manipulations and problem solving has resulted in the production of an array of textbooks which meet these demands. As a result of this attitude the serious student has his introduction to analysis deferred until he studies advanced calculus, and in some instances until the course in function theory is reached. On the other hand the student who takes but one year of calculus all too often remembers the subject only as a collection of rules and formulas and has few if any impressions concerning the nature of the reasoning employed and the elegance of the meth-

DETROIT PUBLIC LIBRARY

ods. It is encouraging that some of the better books published very recently indicate a definite trend away from this defeatist attitude.

The insertion of an isolated chapter on integration early in the calculus text is a practice which has lately become vogue. The chief advantages claimed for such a procedure seem to be that interesting applications may be made earlier in the course and that concurrent courses in physics or engineering may be taken with greater profit. An obvious disadvantage is that time must be taken for a review of this early chapter on integration if the subsequent chapters on integration are to be preceded by chapters which deal only with differential calculus.

The tendency to emphasize numerous applications early in the course in calculus has led some writers to take up the calculation of the area under a curve prior to the definition of the definite integral, whereas, if hazy notions are to be avoided the definite integral should be used to define the area under a curve. Justification by logic rather than by magic of the method of integration by substitution, the correct proof of the formula for the derivative of a function of a function, and the distinction between multiple and iterated integrals are other cases in point where proper care is not always exercised. Relatively few additions are being made to the hierarchy of books on introductory calculus which pay careful attention to questions of this kind. A detailed discussion of these and other matters will not be attempted here, but it is the writer's belief that the introductory and advanced courses in the calculus should be presented in the same spirit and that the two courses should form a unified two years' course in the subject.

6. Conclusion. The ever increasing multiplicity of books and treatments relating to introductory college mathematics has an important relation to methods of mathematical instruction and to the shaping of the curriculum, and it is believed that more definite aims and norms should be established. It is suggested that precision of definitions, simplicity and elegance of proofs, and significance of the work for the further study of mathematics be made to sound the dominant notes. It is believed that emphasis on such matters should not be inconsistent with the purposes of a general course in mathematics, especially if the best books of the survey type are used for collateral reading assignments.

It is undeniably true that students have difficulty with courses of the type which have been advocated in this discussion. Textbooks which develop the concepts and theorems carefully and completely are by their very nature difficult for students to read and make great demands on their powers of concentration. This, however, is as it should be, if the thesis is valid that the main function of the instructor is to elaborate on the subject and to clarify the points of difficulty encountered by the student in his reading. The roles of entertainer, taskmaster, and drillmaster should be subsidiary to that of interpreter if the true aims of mathematical education are to be realized.

DIFFERENTIATION OF FOURIER SERIES AND INTEGRALS

A. E. TAYLOR, University of California, Los Angeles

1. Introduction. The object of this paper is to state precise necessary and sufficient conditions under which the Fourier series of a function f may be formally differentiated, term by term, to obtain the Fourier series of the derivative f'. There is an analogous consideration of Fourier integrals. The theorems and proofs are all elementary in character. They are of such a nature as to be readily adapted to the needs of a course at the advanced calculus level, or slightly beyond, where students meet the problem of Fourier representation as it arises in connection with the solution of physical problems.

It should be pointed out at once that the questions at issue here are easily disposed of with the aid of the Lebesgue integral. One may readily prove that if f and f' belong to the class $L(-\pi, \pi)$ the Fourier series of f' results from formally differentiating the Fourier series of f if and only if $f(x)$ is almost everywhere equal to a suitably chosen indefinite integral of f', and if in addition,

$$\int_{-\pi}^{\pi} f'(x)dx = 0.$$

The necessity of these conditions hinges upon the theorem that two functions are equivalent if they have the same Fourier coefficients.

2. Fourier series and the class S. We shall denote by S the class of real functions f defined for all values of the real variable x, and subject to the following limitations:

(a) $f(x+2\pi)=f(x)$;

(b) *to each f in S there corresponds a finite number of points $x_0, x_1, \cdots, x_m$ $(-\pi=x_0<x_1< \cdots <x_m=\pi)$, such that the derivative f' exists throughout each open interval (x_{k-1}, x_k) $(k=1, 2, \cdots, m)$. Furthermore, it is required that f' be bounded and Riemann-integrable over each of these subintervals.*

It follows from (b) that f is continuous in the open interval (x_{k-1}, x_k). Furthermore, by the law of the mean, if M is the least upper bound of $|f'(x)|$ on (x_{k-1}, x_k), and x, x' are any two points within that interval, $|f(x)-f(x')| \leqq M|x-x'|$. Therefore, by Cauchy's criterion for the existence of a limit, the function approaches limits $f(x_{k-1}+0)$ and $f(x_k-0)$ at the left and right ends, respectively, of the interval. Then, by a standard argument,*

$$\int_{x_{k-1}}^{x_k} f'(x)dx = f(x_k - 0) - f(x_{k-1} + 0). \tag{1}$$

It is clear that if f is in S and g is a continuously differentiable function with period 2π, the product function fg is in the class S.

* See Philip Franklin, A Treatise on Advanced Calculus, New York, 1940, p. 202. Observe that it is not necessary to know anything about the differentiability of $f(x)$ at the ends of the interval (x_{k-1}, x_k).

THEOREM 1. *For a function f of class S, the Fourier series of f' results by formal differentiation of the Fourier series of f if and only if $f(x_k-0)=f(x_k+0)$ when $k=1, 2, \cdots, m$.*

Proof. If a_n, b_n are the Fourier coefficients of f, and a_n', b_n', are those of f', the statement, that the Fourier series of f' is obtainable by formally differentiating the Fourier series of f, is expressed by the equations

$$a_n' = nb_n, \qquad b_n' = -na_n, \qquad n = 0, 1, 2, \cdots.$$

These may be written conveniently in the form

$$a_n' + ib_n' = -in(a_n + ib_n),$$

or, taking cognizance of the integral formulas for the coefficients,

$$\int_{-\pi}^{\pi} f'(x)e^{inx}dx = -in\int_{-\pi}^{\pi} f(x)e^{inx}dx, \qquad n = 0, 1, 2, \cdots. \tag{2}$$

We transform these conditions as follows:

$$\int_{-\pi}^{\pi} f'(x)e^{inx}dx = \sum_{k=1}^{m}\int_{x_{k-1}}^{x_k} f'(x)e^{inx}dx;$$

$$\int_{x_{k-1}}^{x_k} f'(x)e^{inx}dx = f(x_k - 0)e^{inx_k} - f(x_{k-1} + 0)e^{inx_{k-1}} - in\int_{x_{k-1}}^{x_k} f(x)e^{inx}dx.$$

Here $x_0, x_1, \cdots, x_m$ have the meaning indicated in condition (b) of the definition of class S; the formula of integration by parts takes the above form in view of formula (1).

Let us now write

$$c_k = f(x_k - 0) - f(x_k + 0), \qquad k = 1, 2, \cdots, m.$$

Then we see that, since $f(x_0+0)=f(x_m-0)$,

$$\int_{-\pi}^{\pi} f'(x)e^{inx}dx = \sum_{k=1}^{m}\{f(x_k - 0)e^{inx_k} - f(x_{k-1} + 0)e^{inx_{k-1}}\} - in\int_{-\pi}^{\pi} f(x)e^{inx}dx$$

$$= \sum_{k=1}^{m} c_k e^{inx_k} - in\int_{-\pi}^{\pi} f(x)e^{inx}dx;$$

the sum has been rearranged, and an appeal made to periodicity. Equations (2) now take the form

$$\sum_{k=1}^{m} c_k e^{inx_k} = 0, \qquad n = 0, 1, 2, \cdots. \tag{3}$$

The determinant of this linear homogeneous system in the c's, when n is allowed the range $0, 1, \cdots, m-1$, is well known. Its value is

$$\Pi(e^{ix_k} - e^{ix_j}),$$

the product being taken for j and k from 1 to m, with $j<k$. The determinant is thus obviously different from zero. It follows that the system of conditions (3) holds if and only if all the c's are zero. This completes the proof of the theorem.

3. Fourier integrals and the class T. Let T denote the class of real functions f defined for all values of the real variable x, and subject to the limitations:

(a) *To each f in T there corresponds an enumerable set of points $\{x_n\}$, $n=0, \pm 1, \pm 2, \cdots$, so arranged that $x_n<x_{n+1}$, and that $x_n\to+\infty$ as $n\to+\infty$, while $x_n\to-\infty$ as $n\to-\infty$. The derivative f' exists except perhaps at the points x_n, and is bounded and Riemann-integrable over each interval (x_n, x_{n+1});*

(b) *the following integrals are convergent:*

$$\int_{-\infty}^{\infty} |f(x)|\,dx, \qquad \int_{-\infty}^{\infty} |f'(x)|\,dx.$$

To obtain, for Fourier integrals, an analogue of Theorem 1, we consider, instead of Fourier coefficients, Fourier transforms. The analogue of conditions (2) is then the equation

$$\int_{-\infty}^{\infty} f'(x)e^{itx}dx = -it\int_{-\infty}^{\infty} f(x)e^{itx}dx, \tag{4}$$

where t is a real parameter. If (4) is true for all values of t then formally, at least, the Fourier integral representation of f' results by differentiating under the integral in the Fourier integral representation of f.

THEOREM 2. *If f is in class T and if*

(a) $f(x_n-0)\to 0$ *as* $n\to+\infty$,

(b) $f(x_n+0)\to 0$ *as* $n\to-\infty$,

(c) *the series* $\sum_{-\infty}^{\infty}|f(x_n-0)-f(x_n+0)|$ *is convergent,*

then (4) *is an identity in t if and only if $f(x_n-0)=f(x_n+0)$ for all integral values of n.*

Proof. We transform equation (4) in a manner similar to the transformation of (2), as carried out in the proof of Theorem 1. From the formula

$$\int_{x_\mu}^{x_\nu} f'(x)e^{itx}dx = -it\int_{x_\mu}^{x_\nu} f(x)e^{itx}dx + f(x_\nu-0)e^{itx_\nu} + \sum_{n=\mu+1}^{\nu-1}[f(x_n-0)-f(x_n+0)]e^{itx_n} - f(x_\mu+0)e^{itx_\mu},$$

together with the use of conditions (a), (b), (c) of the theorem, it is clear that (4) is equivalent to the equation

$$\sum_{-\infty}^{\infty}\{f(x_n-0)-f(x_n+0)\}e^{itx_n}=0, \tag{5}$$

where the series is absolutely convergent, and hence uniformly convergent with respect to t.

To complete the proof, let us introduce the operation

$$M[\phi] = \lim_{A\to+\infty} \frac{1}{2A}\int_{-A}^{A} \phi(t)dt.$$

This operation is certainly meaningful if ϕ is a bounded function which is integrable over every finite interval. Moreover, if $\phi_n(t)\to\phi(t)$ uniformly in t, then $M[\phi_n]\to M[\phi]$, for

$$|M[\phi_n] - M[\phi]| = |M[\phi_n - \phi]| \leqq \text{l.u.b.} \; |\phi_n(t) - \phi(t)|.$$

The operation M has the further property that

$$M[e^{i\lambda t}] = \begin{cases} 0 & \text{if } \lambda \neq 0, \\ 1 & \text{if } \lambda = 0. \end{cases}$$

Now suppose that

$$\phi(t) = \sum_{-\infty}^{\infty} c_n e^{it x_n},$$

where $c_n = f(x_n - 0) - f(x_n + 0)$. It follows from the foregoing considerations that, for any fixed m,

$$M[\phi(t)e^{-itx_m}] = \sum_{-\infty}^{\infty} c_n M[e^{it(x_n - x_m)}] = c_m.$$

In this way we see that (5) is an identity in t if and only if all the c's are zero. This completes the proof of Theorem 2.

The meaning of conditions (a)–(c) of Theorem 2 can best be made clear with the aid of the concept of the total variation of a function. Let us denote by f^* the function defined as follows:

$$f^*(x) = f(x) \text{ except at the points } x_n,$$
$$f^*(x_n) = \tfrac{1}{2}[f(x_n + 0) + f(x_n - 0)].$$

Then, for any f in S, conditions (a)–(c) hold if f^* is of bounded variation in the range $(-\infty, \infty)$. This is not difficult to show, and we omit the proof. On the other hand, if f is in S, and (c) holds, then f^* is of bounded variation, and therefore (a) and (b) hold as well. To see this, let

$$F(x) = \int_{-\infty}^{x} f'(t)dt, \tag{6}$$

and define $g(x) = f^*(x) - F(x)$. The total variation of F is

$$\int_{-\infty}^{\infty} |f'(t)|\, dt,$$

and g is a step-function whose total variation is given by the series in condition (c). Thus, if (c) holds, g, and hence f^*, is of bounded variation.

It is of interest to remark that there exist functions in the class T such that the series in condition (c) is divergent. For example, let

$$x_0 = 0, \quad x_1 = 1, \quad x_n = x_{n-1} + \frac{1}{n}, \qquad n = 1, 2, \cdots.$$

If n is of the form 2^k, $k=1, 2, 3, \cdots$, define $f(x)=1$ in the interval $x_{n-1}<x<x_n$. For all other values of n define

$$f(x_{n-1}+0) = \frac{(-1)^{n+1}}{n}, \qquad f(x_n - 0) = \frac{(-1)^{n+1}}{n+1},$$

and define f as a linear function between x_{n-1} and x_n. Finally, let f be an even function. It is then verifiable that f is in T, and that the series in (c) diverges more rapidly than the series whose general term is $2/(n+1)$.

In the above example the lower limit of $x_{n+1}-x_n$ is zero. The following lemma shows that if the lower limit of $x_{n+1}-x_n$ is positive, then conditions (a)–(c) are fulfilled, and a great deal more.

LEMMA. *If f is in T, and if m_n is the greatest lower bound of $|f(x)|$ in the open interval (x_n, x_{n+1}), then the series*

$$\sum_{-\infty}^{\infty} m_n, \qquad \sum_{-\infty}^{\infty} |f(x_n+0)|, \qquad \sum_{-\infty}^{\infty} |f(x_n-0)|$$

are either all convergent or all divergent. If there exists a positive constant h such that $h \leqq x_{n+1}-x_n$, $n=0, \pm 1, \pm 2, \cdots$, they are all convergent.

Let us temporarily, for convenience of writing, assume that $f(x)$ is defined at the ends of the interval (x_n, x_{n+1}) by its limiting values from within that interval. Then there must be some ξ_n for which $x_n \leqq \xi_n \leqq x_{n+1}$ and $|f(\xi_n)| = m_n$. We have

$$|f(\xi_n) - f(x_n+0)| = \left| \int_{x_n}^{\xi_n} f'(x)dx \right|,$$

$$|m_n - |f(x_n+0)|| \leqq \int_{x_n}^{\xi_n} |f'(x)|\,dx \leqq \int_{x_n}^{x_{n+1}} |f'(x)|\,dx,$$

whence, since the series

$$\sum_{-\infty}^{\infty} \int_{x_n}^{x_{n+1}} |f'(x)|\,dx$$

is convergent (by the definition of class T), we conclude, by the comparison test, that the first two series in the lemma converge or diverge together. The proof as regards the first and third series is entirely similar. Finally, if $0<h \leqq x_{n+1}-x_n$,

$$\int_{x_n}^{x_{n+1}} |f(x)|\,dx \geqq (x_{n+1} - x_n)m_n \geqq hm_n.$$

Since $\int_{-\infty}^{\infty}|f(x)|dx$ is convergent, it follows that the series $\sum_{-\infty}^{\infty}m_n$ converges.

The conclusion of Theorem 2 may be drawn from less restrictive hypotheses.

THEOREM 3. *If f is in the class T, and if the improper integral*

$$\int_{-\infty}^{\infty} |F(x)|\,dx \tag{7}$$

is convergent, where $F(x)$ is defined by (6), *then* (4) *is an identity in t if and only if $f(x_n-0)=f(x_n+0)$ for all integral values of n.*

To see that the hypothesis here is weaker than that of Theorem 2, it suffices to consider the following function. Let

$$x_0 = 0, \quad x_1 = 1, \quad x_n = x_{n-1} + \frac{1}{n}, \qquad n = 1, 2, \cdots.$$

If n is of the form 2^k, $k=1, 2, 3, \cdots$, define $f(x)=1$ in the interval $x_{n-1}<x<x_n$. Otherwise let $f(x)$ equal zero. Then the integral (7) is zero, but the series in (c) of Theorem 2 is divergent.

Proof of Theorem 3. The function $F(x)$ is continuous, and $F(x)\to 0$ as $x\to-\infty$. $F(x)$ approaches a limit when $x\to+\infty$, because the integral of f' from $-\infty$ to $+\infty$ is convergent. This limit must be zero, since otherwise the integral (7) would diverge. Now

$$\int_{x_{k-1}}^{x_n} f'(x)e^{itx}dx = F(x_n)e^{itx_n} - F(x_{n-1})e^{itx_{n-1}} - it\int_{x_{n-1}}^{x_n} F(x)e^{itx}dx.$$

Hence, summing on n from $\mu+1$ to ν,

$$\int_{x_\mu}^{x_\nu} f'(x)e^{itx}dx = F(x_\nu)e^{itx_\nu} - F(x_\mu)e^{itx_\mu} - it\int_{x_\mu}^{x_\nu} F(x)e^{itx}dx.$$

If now $\nu\to+\infty$ and $\mu\to-\infty$, we see that equation (4) takes the form

$$it\int_{-\infty}^{\infty} g(x)e^{itx}dx = 0, \tag{8}$$

where $g(x)=f(x)-F(x)$. The integral in (8) is absolutely, and hence uniformly, convergent with respect to t, because of our hypotheses.

Let us now suppose that (8) holds for all values of t. Then, if $t\neq 0$,

$$\int_{-\infty}^{\infty} g(x)e^{itx}dx = 0, \tag{9}$$

and (9) is also true if $t=0$, because the function defined by the integral is continuous. Now let us multiply (9) by e^{-ivt}, and integrate from $-p$ to p, where $p>0$. Then

$$0 = \int_{-p}^{p} e^{-iyt}dt \int_{-\infty}^{\infty} g(x)e^{itx}dx = \int_{-\infty}^{\infty} g(x)dx \int_{-p}^{p} e^{it(x-y)}dt,$$

$$0 = 2\int_{-\infty}^{\infty} g(x)\,\frac{\sin p(x-y)}{x-y}\,dx.$$

But it is well known* that the limit of this last integral, as $p \to \infty$, is $\pi g(y)$, provided that g has a derivative at y. In particular, then, $g(y)=0$ if $x_{n-1}<y<x_n$. This implies that $f(x_n+0)=f(x_n-0)$, since F is continuous.

On the other hand, suppose that $f(x_n-0)=f(x_n+0)$, $n=0, \pm 1, \pm 2, \cdots$. This implies that $g(x_n-0)=g(x_n+0)$. But g is constant in each interval $x_{n-1}<x<x_r$, since $g'(x)=0$ there. Hence we infer that g has the same constant value, say c, within each interval. The only possibility is that $c=0$, since the integral

$$\int_{-\infty}^{\infty} |\, g(x)\,|\, dx$$

is convergent. Thus (9) is an identity in t. But then so is (4), which is equivalent to (8). This completes the proof of Theorem 3.

MATHEMATICS, 300 B.C.–200 B.C.

MAX DEHN, St. John's College

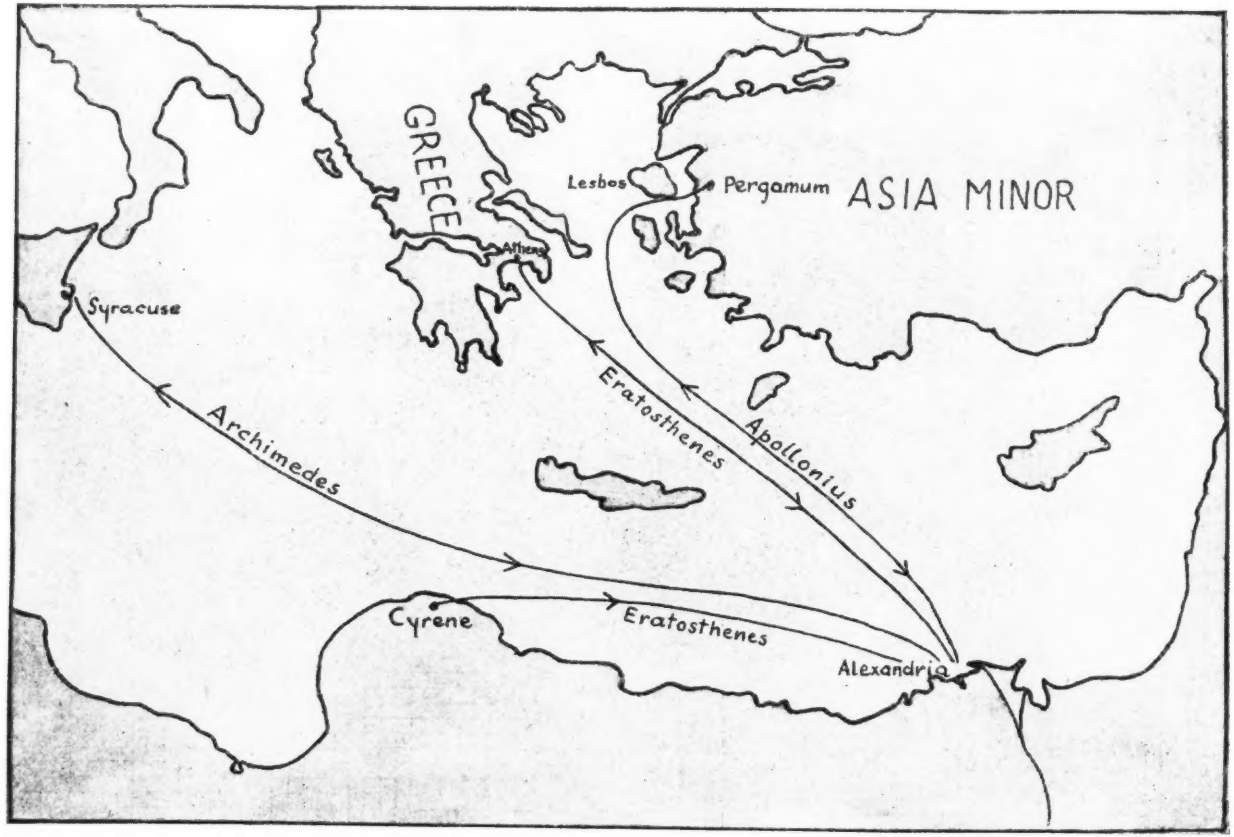
1. The life of Archimedes. The third century before Christ was dominated by the achievements of two men, Archimedes and Apollonius.

Archimedes has been considered, during his life and since his death up to this very day, the best known mathematician. He died in the year 212 B.C. when the Roman army conquered Syracuse. About fifty years later, the Greek historian Polybius, living in Rome and writing on Roman history, related how Archimedes, by his mechanical inventions, became a formidable adversary to the Roman general who besieged Archimedes' native city. "The soul of one man," writes Polybius, "created almost insurmountable obstacles for the Roman army."

Archimedes saw the mathematical structure of static phenomena. This insight enabled him to do important engineering work in war and peace, and to bring to light the basic principles of the statics of rigid bodies and ideal fluids. He does not seem, however, to have attached too high a value to these achievements, since he wanted on his own tombstone a figure symbolic of his measurement of the sphere: a sphere with the circumscribed cylinder.

He was of noble birth, a kinsman and friend of Hiero, king of Syracuse. Syracuse had been for many centuries a center of commerce and culture, a point

* See, for example, R. V. Churchill, Fourier Series and Boundary Value Problems, New York, 1941, pp. 89–90.


GREECE
Lesbos
Pergamum
ASIA MINOR
Athens
Syracuse
Eratosthenes
Apollonius
Archimedes
Cyrene
Eratosthenes
Alexandria

ANNUAL REPORT

where Greeks and Phoenicians met. It is very probable that Archimedes went to Alexandria and studied there with the successors of Euclid.

A great part of his works is extant. There are no textbooks among them; many of them are concerned with theories or single problems. He was well aware of the value of discoveries and claimed the priority for his own. To show his superiority, he proposed to his Alexandrian competitors certain problems to be solved and certain theorems to be proved, intentionally including among the theorems some wrong ones. To take pride in one's own discoveries is perhaps not the sign of a philosophical mind, but it is certainly characteristic of times of great scientific progress. Archimedes was primarily a research man. He founded no school and had, as far as we know, no personal followers.

Archimedes died in the year 212 B.C. at the hand of a common Roman soldier. His tomb was found and restored by Cicero one hundred and fifty years later, when the latter was governor of Sicily. The Roman statesman did not share our reverent feeling for the unique genius of Archimedes, but spoke with condescending pity of the "modest man operating with sand and writing stylus" (paper and pen).

2. The achievements of Archimedes. (a) *Foundations of mathematics.* He was probably the first to emphasize the axiomatic foundation of continuity, stating the following postulate of basic importance for all non-algebraic operations: The difference of two unequal quantities of the same kind, when added to itself a sufficient number of times, will exceed any other quantity of the same kind. This postulate was called, in the nineteenth century, the postulate of Archimedes. But Archimedes himself did not call it an axiom. He says only that he had to assume it for his deductions and that the mathematicians before him, by tacitly using it, had achieved results universally acknowledged as right. This attitude again shows Archimedes' non-philosophical trend of mind. He did not concern himself with eternal truths and ideas; he preferred to reach his aim by assuming the obvious as true.

Of similar character was the other assumption enabling him to assign to a plane (convex) curve a length, and to a curved (convex) surface an area. We may formulate the assumption this way: if one closed convex surface (curve) is completely inside another closed convex surface (curve), then the former has a smaller area (length) than the latter. It would be interesting to know how he would have assigned a length to a non-plane curve or an area to a surface of negative Gaussian curvature; for example, to the hyperboloid of one sheet.

An application of the "Archimedian" axiom is the computation of the number of grains of sand sufficient to fill the "universe" in the sense of the astronomers of his time. He generated this number by means of exponential operations. This semi-popular work, addressed to Hiero's son Gelo, shows the surprising power of mathematical symbols.

An application of the assumption concerning the length of a plane curve was the approximation of π, the ratio of the circumference of a circle to the diameter. We have seen that, in Euclid, there are no approximations of irrational numbers.

Archimedes computed the length of the perimeter of the regular polygons of 6×2^n sides, and in this manner obtained (in modern notation)

$$2^n \frac{a_n}{b_n} > \frac{\pi}{6} > 2^{n-1} a_n, \qquad (n = 1, 2, \cdots),$$

where

$$b_n = \sqrt{2 + b_{n-1}},$$
$$a_n = \sqrt{2 - b_{n-1}},$$

with

$$b_0 = \sqrt{3}.$$

Archimedes gives approximate values for the resulting algebraic numbers for $n=1, 2, 3, 4$ and obtains

$$\frac{22}{7} > \pi > \frac{223}{71}.$$

The history of the measurement of the circle goes back to very ancient times. The number 3 as an approximate value of π is used by people of low scientific standing. The comparison between the simple experiment yielding this approximation and Archimedes' procedure enabling us to determine π to any degree of accuracy demonstrates the wide distance between two levels of human thinking.

(b) *Problems of tangents and areas.* The major part of the mathematical work of Archimedes is related to what we now call Calculus. For example, the determination of the *tangents* to the "Archimedian" spirals is related to the differential calculus. In the work preserved by Eutokius (500 A.D.) we find the solution of the problem of determining the maximum of the function $x(s-x)^2$. This is done by determining a hyperbola of the type $xy=c$ which touches the parabola $y=(s-x)^2$. We see that Archimedes solved the problem of finding the maximum through the use of tangents as we do it now.

Much more important are the problems connected with the process of *integration.* We have already mentioned the determination of the area of the surface of a sphere with given radius, and the determination of its volume. Archimedes started with the computation of the area of the surface and, for this purpose, had to compute the integral of $\sin x$. He achieved this integration by establishing the identity

$$\sin\frac{\pi}{2n} + \sin\frac{2\pi}{2n} + \sin\frac{3\pi}{2n} + \cdots + \sin\frac{(2n-1)\pi}{2n} = \cot\frac{\pi}{4n}.$$

Characteristic for the trend of Greek mathematics is the formulation of this problem: It is required to construct a plane figure having the same area as the surface of a sphere with given radius. The answer is: The plane figure is a circle with radius twice that of the given sphere. Having found the area of the surface, Archimedes determined the volume.

Further we find Archimedes dealing with the construction of a square with

area equal to that of a plane figure bounded by arcs of a parabola and by straight lines. For the squaring of the parabola, he had to determine the asymptotic value of the sum

$$(1^2 + 2^2 + \cdots + n^2)/n^3.$$

In another solution of the problem, Archimedes makes use of mechanical notions, primarily of the center of gravity and its obvious properties. (Incidentally, it is not easy to take the existence of the center of gravity of an arbitrary body for granted.) He uses these properties to evaluate, as we shall say, an integral.

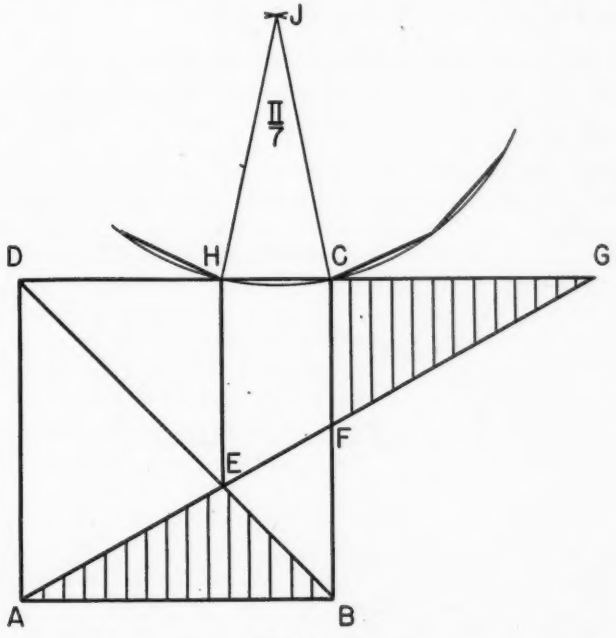


FIG. 1

This is also the method he uses in a work written for Eratosthenes, an outstanding astronomer and mathematician of his time. This work was found only recently in Istanbul, written on parchment that was later used for a liturgical text. Here Archimedes combines the mechanical method with the device of taking areas or volumes as if these were aggregates of lines or surfaces. Everywhere else in his works he uses the exact method of exhaustion. In this latter one, dedicated to a fellow master of mathematics, he does not hesitate to bring into play the relations between properties of areas and properties of a sum of lines. In this work he finds the *volume* of a sphere directly (thereby avoiding the integration of the sine function) reducing the problem to that of the mensuration of the cone.

There are probably extant in Arabic translation some other works of Archimedes. Not long ago there was discovered in the work of an Arabic author a remarkable construction of the regular heptagon by Archimedes. It is as follows: $ABCD$ is a square. A line $AEFG$ is so constructed that it meets the diagonal DB in E, the side BC in F, the side DC in G, so that the triangles AEB and FCG have the same area. H is a point on DC such that EH is parallel to CB. Then HC is the side of the regular polygon with 14 sides in the circle with the radius CG.

Such constructions with a moving ruler meeting two given lines in a prescribed way were often used in Greek mathematics.

3. The achievements of Apollonius. Apollonius, some forty years younger than Archimedes, was born in Pergamum, about 250 B.C. Pergamum was, at this time, beginning to be a center of culture. There are still extant great works of art produced there at the time of Apollonius. It is probable that he lived a part of his life in Alexandria, but he was closely connected with at least one of the rulers of Pergamum, Attalus, to whom he dedicated one book of his great *treatise on conics*.

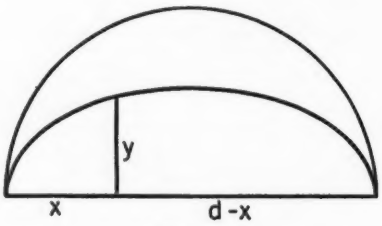


FIG. 2

Whereas Archimedes made his investigations in regions hitherto untrodden and used new methods, Apollonius uncovered in his principal work, the treatise on conics, a field of geometry already partially known, as a grand structure of admirable wealth and beauty. Through the theory of conics the astonishing fecundity of mathematical thought became apparent, perhaps for the first time. One simple notion, in this particular case, that of the plane sections of a cone, produces a wealth of problems and theorems.

One aim of Apollonius was to cover in a systematic treatment all that was already known about conics. Originally, the conics were considered as spatial phenoma. But we find Archimedes already using a definition of the conics as plane loci. The points of these loci are defined by a pair of lines which are different from our common rectangular coordinates only in so far as they are not a pair of proportions (or numbers) obtained through the introduction of unit lines. In Archimedes the "equation" of the conic has the form

$$y^2 = kx(d - x)$$

where k is a proportion (or a number). For $k>0$ and $k\neq 1$ we get the ellipse immediately as the projection of the circle for which $k=1$. In Apollonius, the equation for the conics, the basis for all his investigations, is in oblique coordinates

$$y^2 = px + \frac{px^2}{a}$$

where the + sign gives the hyperbola (y^2 is "surpassing" px), the − sign characterizes the ellipse (y^2 is "deficient" with regard to px); for infinitely great a we get the parabola (y^2 "equals" px). These names for the different conics are probably Apollonius' own.

Apollonius had to solve many problems to achieve a systematic theory of the conics. In the original equation for the conic, there are three parameters: p, a, and the angle between the x line and the y line. From these data one had to find the position and the length of the axes. Further, to have theorems valid for both ellipse and hyperbola, it was necessary to take the two branches of the hyperbola together as one curve, a difficult abstraction since it seems to contradict the appearances. This abstraction became easy only after the introduction of infinitely distant points in the seventeenth century.

In the work of Apollonius there are found the elementary construction of tangents to a given conic through a given point or in a given direction, the discussion of the problems of normals through a given point, and geometric constructions carried out with the help of conics. These problems are related to problems of maxima and minima and to the discussion of the intersection of conics. This latter problem is equivalent to the determination of the number of real roots for an equation of the fourth degree by means of certain inequalities between the coefficients.

The problem of determining a conic by five of its points is not considered, in spite of the solution of equivalent problems. Probably the obstacle was that the problem could not be easily enunciated, because it was necessary to determine at the same time whether one could construct an ellipse, hyperbola, or parabola going through the five given points (the assumption being that no three of them are collinear).

It seems quite impossible to find out who it was that determined the foci. One wonders in what way the old mathematicians came to discover these characteristic points. Probably Euclid already knew that the conics were loci of points for which the distances from a fixed point and from a fixed line have a fixed ratio. Apollonius knew the most important properties of the foci of the ellipse and hyperbola, namely, that they are the centers of the orthogonal involutions, that the tangents make equal angles with the lines through the foci, and finally the theorem concerning the sum or difference of the focal distances.

We conclude our report on Archimedes and Apollonius with a remark by Leibnitz: He who understands Archimedes and Apollonius will admire less the achievements of the foremost men of later times.

DISCUSSIONS AND NOTES

EDITED BY MARIE J. WEISS, Sophie Newcomb College, New Orleans, La.

The department of Discussions and Notes is open to all forms of activity in collegiate mathematics, except for specific problems, especially new problems, which are reserved for the department of Problems and Solutions.

A REMARK ON INTEGRATION BY PARTS

J. L. BORMAN, Purdue University

In employing the formula $\int udv = uv - \int vdu$, one makes a skillful choice for u and dv so as to have a product vdu which is readily integrable. Once the choice for dv is made, the function v is obtained by integration. The constant of integration is invariably chosen as zero, since it is felt that this is the simplest choice to make. The point of this note is that the popular choice is, in some cases, the worst rather than the best.

For the sake of completeness let us examine the theory. Suppose it is required of us to integrate

$$\int f(x)g(x)dx$$

and we let

$$u = f(x), \qquad dv = g(x)dx.$$

If $G(x)$ is a function such that $G'(x) = g(x)$, then

$$\int f(x)g(x)dx = f(x)G(x) - \int f'(x)G(x)dx.$$

But it is equally true that

$$\int f(x)g(x)dx = f(x)[G(x) + c] - \int f'(x)[G(x) + c]dx$$

for any constant c.

The object is to choose c so that the last integration is as simple as possible. In most cases the choice $c = 0$ is best; indeed, the choice is made automatically, but this is not a rule without exceptions as the following example shows.

In the integral

$$\int x \arctan x \, dx$$

let $u = \arctan x$ and $dv = xdx$, then

$$du = dx/(1 + x^2) \quad \text{and} \quad v = x^2/2 + c.$$

Now if we let $c = 0$,

$$\int x \arctan x\,dx = \frac{x^2}{2}\arctan x - \int \frac{x^2 dx}{2(1+x^2)}.$$

While the last integral is not difficult to evaluate we submit that a tremendous simplification can be produced by choosing $c=1/2$. In this case

$$\int x \arctan x\,dx = \frac{(x^2+1)}{2}\arctan x - \frac{1}{2}\int dx.$$

And now the last integration is obvious.

The reader might be interested in constructing other examples of his own. The method seems specially suitable in cases where one is asked to integrate such functions as arc tan $\sqrt{x+k}$ and log $(x+k)$.

CONTINUOUS METHODS FOR AMORTIZING LIFE INSURANCES

C. W. VICKERY, Washington, D. C.

The use of credit, with installment payments for repayment of the debt, for the purchase of real estate and durable consumers' goods, has become widespread during recent years. In case of death of the wage earner there may be a need for life insurance to pay off the outstanding debt and protect the estate in possession of the property. While term insurance has been used for this purpose, the necessary protection could be provided more economically through the use of a policy with a decreasing amount designed to be precisely, or approximately, equal to the outstanding balance of the debt at the time of death of the insured. This paper provides a solution of the problem which is exact in the case of a continuously amortizing debt. For the case of annual, monthly, or other periodical payments, usually encountered in practice, a correction is provided which makes the formulas approximately correct. By the device of introducing a new rate of interest, the calculations are reduced to the use of conventional tables except in cases where these may not be available for the required rate. The extensive use of these methods would be facilitated by the calculation of tables for the most commonly used rates of interest.

First we consider the case of a continuously amortizing debt, of present value 1, to be completely amortized at the end of n years, starting at the present time. The balance of principal remaining unpaid at any time t between 0 and n will be

$$\frac{\bar{a}_{\overline{n-t}|(r)}}{\bar{a}_{\overline{n}|(r)}},$$

where r denotes the annual effective rate of interest. The symbol $(\overline{AA})^{1}_{x\overline{n}|}$ is used to denote the single premium of an insurance on a life aged x which will pay at the moment of death an amount precisely equal to the outstanding balance of the debt. The bar over the first A indicates that the amortization is continuous while the bar over the second A indicates that the amount of the insurance is payable at the moment of death of the insured. This notation can

be varied to suit other modes of amortization and payment as indicated below.

We have, then,

$$
\begin{aligned}
(\overline{AA})^{1}_{x\,\overline{n}|} &= \frac{1}{\bar{a}_{\overline{n}|(r)}} \int_0^n \bar{a}_{\overline{n-t}|(r)}(1+i)^{-t}\,{}_tp_x\mu_{x+t}dt \\
&= \frac{1}{\delta_r \bar{a}_{\overline{n}|(r)}} \int_0^n [1-(1+r)^{-(n-t)}](1+i)^{-t}\,{}_tp_x\mu_{x+t}dt \\
&= \frac{1}{\delta_r \bar{a}_{\overline{n}|(r)}} \left\{ \int_0^n (1+i)^{-t}\,{}_tp_x\mu_{x+t}dt \right. \\
&\qquad \left. - \int_0^n (1+r)^{-(n-t)}(1+i)^{-t}\,{}_tp_x\mu_{x+t}dt \right\}.
\end{aligned} \tag{1}
$$

It follows that

$$
(\overline{AA})^{1}_{x\,\overline{n}|} = \frac{1}{\delta_r \bar{a}_{\overline{n}|(r)}} \left\{ \overline{A}^{1}_{x\,\overline{n}|(i)} - (1+r)^{-n}\overline{A}^{1}_{x\,\overline{n}|(i')} \right\}, \tag{2}
$$

where

$$
i' = \frac{i-r}{1+r}. \tag{3}
$$

We have thus apparently reduced the problem to that of looking up in tables the single premiums of two term insurances with different rates of interest and performing some simple calculations. This is the case provided we have tables for the required rate of interest i'. It may happen in practice that r is greater than i and hence i' is negative. While this would prevent use of the conventional tables, it would cause no difficulty in the calculation of new tables. For practical use tables could be made up for a few rates i' depending on the rate i allowed by the insurance company, such as 3%, and two or three of the rates most commonly used in amortizing obligations, such as 4½% and 5%.

Formula (2) is precise for the case of a continuously amortizing obligation. In the case of a debt being amortized by periodical payments, formula (2) is precise only in case death occurs immediately after a payment has been made. If death occurs immediately before a payment has been made, then the amount paid by the insurance is less than the total amount required by an amount equal to a single payment. We thus need to add to (2) the single premium of a term insurance with amount equal to a single payment. We thus have, to a close approximation, with payments made p times per year:

$$
(A\overline{A})^{1\,(p)}_{x\,\overline{n}|} = (\overline{AA})^{1}_{x\,\overline{n}|} + \frac{1}{p\ddot{a}^{(p)}_{\overline{n}|(r)}} \cdot \overline{A}^{1}_{x\,\overline{n}|}. \tag{4}
$$

For monthly, quarterly, or annual payments formula (4) is sufficiently close, for all moments of death, for practical purposes. When it is in error it is on the side of safety for the insurance company.

A DERIVATION OF CARDAN'S FORMULA

H. B. CURTIS, Lake Forest College

Consider first the case of a double root of the cubic

$$x^3 + 3Hx + G = 0, \tag{1}$$

where for convenience G is taken positive. The double root found from the equation $3x^2+3H=0$ is $\sqrt{-H}$. Substituting this value for x in (1) we obtain

$$G^2 + 4H^3 = 0,$$

which is the condition for a double root. This gives $H=-\frac{1}{2}\sqrt[3]{2G^2}$, so that the double root in terms of G is $\frac{1}{2}\sqrt[3]{4G}$. Since the sum of the roots is zero the remaining root is $-\sqrt[3]{4G}$, which may be put in the form $2\sqrt[3]{-G/2}$. That is, the remaining root is

$$x = \sqrt[3]{-\frac{G}{2}} + \sqrt[3]{-\frac{G}{2}}.$$

Now putting the function G^2+4H^3 equal to D, let us try to find what function of D exists so that

$$x = \sqrt[3]{-\frac{G}{2} + f(D)} + \sqrt[3]{-\frac{G}{2} - f(D)} \tag{2}$$

shall satisfy the general equation of the cubic (1). Substituting this value in (1) we obtain without much labor

$$\left(\sqrt[3]{-\frac{G}{2} + f(D)} + \sqrt{-\frac{G}{2} - f(D)}\right) \cdot \left(\sqrt{\frac{G^2}{4} - f^2(D)} + H\right) = 0.$$

Since in general the first factor is not zero we have

$$\sqrt{\frac{G^2}{4} - f^2(D)} + H = 0,$$

which on solving for $f(D)$ gives

$$f(D) = \pm \tfrac{1}{2}\sqrt{G^2 + 4H^3}.$$

Putting this value in (2) we have

$$x = \sqrt[3]{-\frac{G}{2} + \tfrac{1}{2}\sqrt{G^2 + 4H^3}} + \sqrt[3]{-\frac{G}{2} - \tfrac{1}{2}\sqrt{G^2 + 4H^3}}$$

which is Cardan's formula.

CLUBS AND ALLIED ACTIVITIES

EDITED BY J. S. FRAME

Send reports of all activities, such as club reports, special features, topics with references, student papers, and other material of interest to J. S. Frame, Michigan State College, East Lansing, Michigan.

A VARIATION OF NEWTON'S METHOD

J. S. FRAME, Michigan State College

To solve an equation $y=f(x)=0$ by Newton's method, we first find an approximation x_1 to the root r by graphical or other methods. If x_1 was chosen sufficiently close to r we then obtain a second and better approximation x_2, by finding the point $(x_2, 0)$ at which the tangent to the curve at the point (x_1, y_1) intersects the x-axis. The slope of this tangent is $y_1' = f'(x_1)$, so we have

$$\frac{0 - y_1}{x_2 - x_1} = y_1', \tag{1}$$

whence

$$x_2 = x_1 + \frac{-y_1}{y_1'} \quad \text{(Newton)}. \tag{2}$$

If $y_2=f(x_2)$ is not sufficiently small, we apply the method once more and compute a second correction $-y_2/y_2'$, and a third approximation $x_3=x_2-y_2/y_2'$. This second application of Newton's method usually gives sufficient accuracy in practical cases, but the approximation may be improved to any desired degree of accuracy by repeated applications of the method, provided that the values of $f(x)$ can be obtained to the required degree of accuracy. This is always possible, though perhaps laborious, if $f(x)$ is a polynomial. For many other functions $f(x)$, if the values are obtained from tables, the accuracy is limited to the number of places given in the tables.

A remarkable improvement in the accuracy of the second approximation x_2 can be obtained with but little extra computation by using the second derivative $y_1'' = f''(x_1)$. This will often insure sufficient accuracy to eliminate the necessity for a second application of Newton's method. We shall assume that y, y' and y'' are continuous functions of x, so that the given curve may be approximated by a parabolic arc near the root and we shall further assume that

$$|2yy''| < y'^2 \tag{3}$$

for all x between x_1 and some value $x=a$ beyond the root, so that the parabolic arc will cut the x-axis in real and distinct points. This excludes the consideration of multiple roots of $f(x)=0$.

A parabola with the same slope and curvature as the given curve at the point (x_1, y_1) has the equation

$$y = y_1 + y_1'(x - x_1) + (y_1''/2)(x - x_1)^2. \tag{4}$$

To find where this parabola crosses the x-axis we set $y=0$, transpose the term y_1, factor out $x-x_1$, and obtain

$$x - x_1 = \frac{-y_1}{y_1' + (y_1''/2)(x - x_1)}. \tag{5}$$

Assumption (3) insures that the second term in the denominator is small compared with y_1, so we may approximate the factor $x-x_1$ in this second term by Newton's value $-y_1/y_1'$. This then gives an approximation $x=X_2$ to the root r which is closer than the approximation x_2 of equation (2).

$$\mathbf{X_2 = x_1 + \frac{-v_1}{y_1' + (y_1''/2)(-y_1/y_1')}}. \tag{6}$$

It may be seen that the denominator in (6) is equal to a slope about half way between the slope of the given curve at $x=x_1$ and the slope at $x=x_2$, and as such is a good approximation to the slope of the chord joining the points (x_1, y_1) and $(r, 0)$.

To illustrate the use of formula (6), we use it to find roots of three typical equations and compare results with the first and second stages of Newton's method.

EXAMPLE 1. To evaluate $\sqrt[3]{2}$.

Let $y=f(x)=x^3-2$, $y'=3x^2$, $y''/2=3x$.

Take $x_1=5/4$. Then $y_1=-3/64$, $y_1'=75/16$, $y_1''/2=15/4$.

A first application of Newton's formula (2) gives:

$$x_2 - 1.25 = \frac{3/64}{75/16 + 0} = .010,$$

$$x_2 = 1.260. \qquad [\text{Error} = +.00007895.] \tag{1.1}$$

Formula (6) gives in one step the values

$$X_2 - 1.25 = \frac{3/64}{75/16 + (15/4)(.010)} = \frac{1}{100.8} = .00992063+.$$

$$X_2 = 1.25992063+. \qquad [\text{Error} = -.00000042.] \tag{1.2}$$

A second application of Newton's formula involves cubing 1.26 to find y_2, but does give the more accurate value

$$x_3 - 1.26 = (-.000376)/(4.7628) = -.00007893.$$

$$x_3 = 1.25992107. \qquad [\text{Error} = +.00000002.] \tag{1.3}$$

EXAMPLE 2. To evaluate sin 50° by solving the cubic equation $8x^3-6x+1=0$ of which it is a root.

Since $1/2<\sin 50°<1$, let us take $x_1=3/4$. Then $y_1=-1/8$, $y_1'=15/2$, $y_1''/2=18$. A first application of Newton's formula (2) gives

$$x_2 - 3/4 = \frac{1/8}{15/2} = \frac{1}{60} = .016667.$$

(2.1) $$x_2 = .766667.$$ [Error = + .000622.]

Formula (6) gives the values

$$X_2 - .75 = \frac{1/8}{15/2 + 18(1/60)} = \frac{1}{62.4} = .016026.$$

(2.2) $$X_2 = .766026.$$ [Error = − .000019.]

A second application of Newton's formula involves cubing 23/30 to find y_2, and gives a result only slightly better than formula (6) gave in one step.

(2.3) $$x_3 = .766050.$$ [Error = + .000005.]

EXAMPLE 3. To solve the equation $x-\cos x=0$.

To avoid the use of tables we may take a first value such as $x_1=\pi/4=0.785398$. Then $y=x-\cos x$, $y'=1+\sin x$, $y''/2=(\cos x)/2$

$$y_1 = \frac{\pi}{4} - \frac{\sqrt{2}}{2} = .078291, \quad y_1' = 1.70711, \quad y_1''/2 = .3536.$$

By Newton's formula (2) we obtain

$$x_2 - .78540 = -\frac{.07829}{1.7071} = -.04586.$$

(3.1) $$x_2 = .73954.$$ [Error = + .000454.]

By formula (6) we obtain

$$X_2 - .785398 = -\frac{-.078291}{1.70711 + (.3536)(-.04586)}$$

$$= -\frac{.078291}{1.69091} = -.046301.$$

(3.2) $$X_2 = .739097.$$ [Error = + .000011.]

It is worth noting how small the error is compared with the first correction. A second application of Newton's method would require the use of tables of cosines for angles in radian measure, whereas the only values needed above were π and $\sqrt{2}$.

CLUB REPORTS 1942–43

Mathematics Club, Hunter College

The Mathematics Club of Hunter College held biweekly meetings during the year 1942–43, at which papers were presented by students. Topics in the fall semester were

Affine transformations, by Ilse Novak

Factorization of determinants, by Barbara Samson

The summation of the P-series by means of the Fourier transformation, by Anna DiFiori

Probability, LaPlace, deMorgan and Venn, by B. O. Koopman of Columbia University, guest speaker.

A volley ball game between the Mathematics Club and Statistical Society was won by the latter.

At the beginning of the spring semester, Hunter's beautiful buildings and campus in the Bronx were taken over by the U. S. Naval Reserve for a training center for Waves and Spars. This resulted in combining the Bronx and Main Building units of the Math Club into one group. Due to crowded conditions and the difficulty of arranging meetings, the Statistical Society was also absorbed, and the three groups heard the following papers together:

Nets of triangles, by Melitta Loewy

Partial fractions, by Joyce Rubin

The path of a heavenly body in relation to another body, by Mary Dolciani.

The activities of the year were brought to a close by the annual Department Party, which this year was held to welcome the freshmen and acquaint them with the students in the Mathematics Department. Professor Louis Weisner directed the Club's activities. The officers for the fall semester were: President, Barbara Samson; Vice-President, Catherine Porcheddu; Secretary, Lucy La-Sala; Treasurer, Anna DiFiori; Publicity Manager, Joyce Larick. The officers for the spring semester were: President, Gladys Henlein; Vice-President, Ilse Novak; Secretary, Mae Perlstein; Treasurer, Irene Silver; Publicity Manager, Augusta Schurrer.

Pi Mu Epsilon, University of Arkansas

In addition to the usual business meetings, Arkansas Alpha enjoyed an initiation banquet on November 23, at which nine new members took the *Pi Mu Epsilon* pledge and read essays on mathematics, and a talk was given entitled

Men of Mathematics, by Dean Hosford.

Nine new members were also initiated in the spring of 1943. Since the University is now operating on a full year basis, a picnic is scheduled in the summer term. Officers elected in May 1943 were: President, Jack Hine; Vice-President, Tom Wheat; Secretary, Gloria Heineman; Treasurer, Charles Oxford.

Kappa Mu Epsilon, Illinois State Normal University

At the first meeting in October, nine new members were initiated. Twenty-seven attended the annual Homecoming Breakfast on October 17, at which Mr. Henry Peppen spoke on his experiences at George Peabody College where he worked on his doctorate. In November a discussion of coding was given, entitled

There's secrecy in numbers, by Mildred Bauer and Mary Underwood.

A Christmas party was held in December at which mathematical games were played. The February meeting consisted of a program of talks and demonstrations on

Historical methods of computation, presented by members of the History of Mathematics class.

The topics at the program meetings in March and April were

Astronomy and Mathematics, with slides, by Dr. C. N. Mills

Mathematical recreations, discussed and illustrated by Eleanor Rae Lower, Edith Robinson, Marjorie Brakenhoff, and Rosemary Monnier.

The year's activities closed with the annual spring banquet in April and a picnic in May. At the banquet interesting talks were given by four graduates of 1942: Shirley Isaacson, Nancy Hightower, Geneva Meers, and Ensign Leo Montgomery. A mimeographed booklet, the *Newsletter*, recorded the activities of the year, and was dedicated to the thirty-nine alumni of *Kappa Mu Epsilon* in service. Officers were: Sponsor, Edith Atkin; President Gauss, Mary Underwood; Vice-President Pascal, Robert De Barr; Secretary Ahmes, Mildred Bauer; Treasurer Napier, Frances Marie Cyrier; Historian Cajori, Marjorie Brakenhoff; Social Director Lilavati, Amber Grauer; Corresponding Secretary Descartes, Dr. C. N. Mills.

Hall Mathematical Society, Lafayette College

The club held well-attended bimonthly meetings. Members of the club discussed the following topics:

The magnetic compass, by Dr. W. M. Smith, John Smith, Boyd Kenvin, and B. C. Youngman

Celestial navigation, by Professor John Cawley and John Attinello

Aerial navigation, by Professor W. G. McLean

The MacMillan system of navigation, by Hugh Mahaffy

The Lafayette College wind tunnel, by John Attinello.

At the November meeting the following movies were presented:

Origin of Mathematics

Rectilinear Coordinates

Scientific demonstrations in physics.

The officers for the year 1942 were: President, Calvin Eells; Vice-President, Boyd Kenvin; Secretary, Benjamin Youngman; Librarian, James Hindenach. The officers elected for the year 1943 were: President, James Hindenach; Secretary-Librarian, Frank Eisberg.

Pi Mu Epsilon, Hunter College

During the year 1942–43, *Pi Mu Epsilon* was first directed by Professor A. D. Bradley. Upon his entrance into the armed services, Professor L. S. Hill took over the directorship. Papers were presented by Gertrude Crosby, Marie Johnson, Fortunata Vitanza, Catherine Porcheddu, Mildred Ackerman, Mary Demitrack, Helen Trief, and Deborah Davidson, on various aspects of

Celestial Navigation, including *The Sumner line, Ageton's method of celestial navigation, Great circle sailing, Gnomonic and Mercator projections.*

The remainder of the year was devoted to the presentation of papers by Elaine Frankel, Harriet Eisenberg, Marie Johnson, and Barbara Samson on the subject of

Cryptography.

Many of the cryptographic systems were based on the work of Professor Hill. The fraternity had two social functions during the year, at which new members were initiated into the chapter and old members were welcomed back. The returning members gave reports of the interesting war positions which their mathematical training had helped them to obtain. The student officers were: Vice-Director, Harriet Eisenberg; Corresponding Secretary, Helen Trief; Recording Secretary, Lucy LaSala; Treasurer, Ilse Novak.

RECENT PUBLICATIONS

EDITED BY VIRGIL SNYDER, Cornell University

All books for review should be sent directly to the editor of this department, American Mathematical Monthly, 531 West 116th Street, New York, N. Y. 27, and not to any of the other editors or officers of the Association.

College Algebra. By Frank Morgan. New York, American Book Company, 1943. 6+368 pages. $2.00.

The present book recognizes that the prospective student who reads it may have had one or two years of previous training in algebra. While preparing the reader with the smaller prerequisite, the book promises the representatives of the other category that they too may find the review worth while. The effort is made to present all new ideas in correct and concise language, this aim being retained throughout the book. A rapid review of elementary notions is followed by the new ideas of the course, which include systems of quadratic equations, ratio and proportion, logarithms, theory of investments, mathematical induction, permutations and combinations, probabilities, theory of equations, partial fractions, determinants, and scales of notation. A laudable feature is the frequent insertion of brief historical notes. Answers are not given. The type and press-work are strictly first-class.

VIRGIL SNYDER

Mathematical Recreations. By M. Kraitchik. New York, W. W. Norton and Company, Inc., 1942. 328 pages. $3.75.

The author states in his preface that this book may be regarded as a revised edition of his similar work, published in French, entitled, "La Mathematique des Jeux." How familiar the latter, published in Brussels, 1930, is to the American mathematical public, I am unable to say. My impression is that in general it has not been accessible to the average reader. Consequently a translation brings another book on a subject of wide appeal to both the layman and the mathematician. It may well take its place beside Ball's famous work. Like the latter it contains not only specific problems, to which answers are given and which are often placed in their historical setting, but also essays on subjects of mathematical interest.

The new edition is more than a translation, for the author has supplemented, pruned, rearranged, and rewritten the material. In the rewriting the author has been especially conscious of the fact that he is writing for the American public. As evidence of this change of point of view it is amusing to note that "un docteur de Sorbonne" has been replaced by "a president of the American Mathematical Society" and the metric system has been changed to the English system. Perhaps the inclusion of the game of craps and of questions relating to the game of bridge might also be mentioned in this connection.

The book opens with several amusing items exercising only the powers of reasoning. The author cleverly brings this chapter "Mathematics Without Numbers" from the second part of the old book to the beginning of the new. The second chapter entitled "Ancient and Curious Problems" continues with interesting problems of French, Hindu, and Arabian origin, and concludes with some amusing wrong arithmetical manipulations. The third chapter, "Numerical Pastimes," includes problems on Diophantine analysis, scales af notation, how to guess a selected number, cryptarithmetic, and a discussion of various topics in number theory such as figurate numbers, Fermat numbers, Mersenne numbers, *etc.* The chapter closes with arithmetical games such as Nim and descriptions of toys such as Chinese Rings.

There are two chapters on geometric questions, one devoted to the problem of finding geometric elements whose measures are integers, the other to geometric recreations. In the latter there is a short discussion of the famous topics of topology: the Königsberg bridges, the four-color problem, and the Mœbius strip; a collection of problems on the dissection of plane figures; and an interesting description of mosaics. A new page of illustrations showing the use of modified geometric configurations in mosaics as well as a paragraph on a mosaic on a sphere is introduced.

Several chapters have been considerably shortened in the new book. These are the two chapters on chess devoted to the problem of the queens and the problem of the knight, and the chapter on magic squares. The latter is still quite extensive and in it some of the material has been systematized by the use of lattices, the word being used in its old mathematical sense. The author credits Mr. D. A. Flanders with this innovation.

The remaining chapters will be summarized briefly. The chapter on the calendar gives a short historical account of the development of the calendar and discusses and illustrates a perpetual calendar. The chapter on probability describes various games of chance together with problems arising therefrom. Under the chapter entitled "Permutational Problems" the author discusses problems of difficult crossings, shunting problems, and problems of distribution such as, for example, the arranging of schedules for sporting matches and tournaments. The book closes with a chapter on miscellaneous positional and permutational games.

MARIE J. WEISS

Prepare Yourself. Physics experiments with practical applications. By L. F. Tuleen, G. S. Porter, and A. Houston. Chicago, Scott, Foresman and Company, 1943. 6+298 pages. $0.96.

This book is another of the many simplified science texts which have appeared since the beginning of the war. It is intended as a laboratory manual for secondary school physics. Experiments have been chosen with a good deal of ingenuity to represent many basic principles of physics as they are applied to common household problems and appliances. A good variety of experiments is included covering most of the important branches of elementary physics. Some experiments are included which, because of the amount of theory covered, as, for instance, experiment 20 on simple machines, or because of their more complicated nature, as some of the experiments on radio, are well suited to those students who progress faster than most. With each experiment is a brief discussion of the theory to be studied together with references to a number of elementary texts.

Unfortunately the book contains many errors in theory and in laboratory practice. Thus the discussion on page 52 and in the first few experiments concerning significant figures and the accuracy of measured data is badly confused, and leaves the student with the mistaken idea that the accuracy of a number depends in some way on the location of the decimal point. This subject is so important to any laboratory method and is so easy to teach correctly that there is little excuse for misleading the student. Experiment 7, "How does water produce pressure?", would be better used to illustrate Archimedes' Principle than hydrostatic pressure. In an elementary manual it might be much better not to mention the Bernouilli Principle at all than to use it to explain the curving of a baseball—a phenomenon to which it does not apply. In experiment 32, page 155, a measurement of the velocity of sound which was made in air at room temperature is corrected to room temperature as if it had been made at 0° C.

It is because of errors like these and others not mentioned here that teachers of physics in colleges and universities have to spend such a large portion of their time teaching students to forget.

F. E. DART

Principios fundamentales de la division del trabajo. By José Barral Souto. (Cuadernas de trabajo No. 10.) Facultad de Ciencias Económicas. Universidad de Buenos Aires, 1941. 55 pp.

The present study by the South American Statistician and Economist Barral Souto has been published by the Instituto de Biometrica at the University of Buenos Aires. It is noteworthy that the Institute has made to the South American student available, under the directorship of Dr. José González Galé, in the same series also Charlier's Lectures and Darmois' Treatise on Mathematical Statistics, a fact that testifies to the keen awareness with which South America is following the development of technical literature abroad. (Neither of these two classics has as yet found its way into English translation.)

The topic of the pamphlet is a borderline case of theory of foreign trade and general economic theory: the problem of division of labor. As such it is a contribution to a field that, so far, has been neglected by mathematical economists. For more than half a century the only major investigation, treating the subject from a mathematical point of view, has been T. O. Yntema's Mathematical Reformulation of the General Theory of International Trade (1932), after the classical and still very readable analysis by Vilfredo Pareto: Teoria matematica dei cambi forestieri, had been published as early as 1884.

The strong influence of romance economic thought on contemporary South American literature manifests itself throughout the book. Starting from the problem as posed by David Ricardo the author continues in the best tradition of the so called School of Lausanne in applying the tools of equilibrium analysis to his object. This makes the mathematical approach tempting and useful.

The treatment itself is algebraic with a few geometrical illustrations that are original and differ from the well established pattern familiar to students of our more recent textbooks from the chapter on comparative costs (where the story is usually told in form of diagrams as they were originally developed in Enrico Barone's Principii di economia politica). Barral Souto's study does not aim, it should be understood, at foreign trade theory primarily but at the problem of division of labor in general. He starts, however, from the usual position as construed by the classical writers in the field of international trade, making the analysis interesting to students of general theory and of foreign trade.

The professional economist may object to the lack of realism in some of the author's symplifying assumptions that are made explicitly, and more frequently still implicitly; this goes especially for the author's neglect of the possibility of changes over time in the elasticities of the functions and of dynamic changes in the entire indifference structure.

To the mathematically interested reader, however, Barral Souto's contribution is a further indication of the considerable interest of our southern neighbors in the use of exact and quantitative methods in the social sciences and of the infiltration of mathematical patterns into fields that, as the present one, are of considerable practical interest to the economic politician as well as of academic interest to the school economist. J. E. MORTON

Commercial Algebra. By H. E. Stelson and H. P. Rogers. New York, The Macmillan Co., 1943. 11+283 pages. $2.50.

This book is concerned with intermediate algebra. It includes the topics ordinarily treated in this subject and also presents chapters of commercial arithmetic on buying and selling merchandise, simple interest, simple discount, compound interest, consumer credit and annuities, together some thirty pages. The chapter on logarithms also contains a discussion of the slide rule. A year of elementary algebra is presupposed. Following the text are a number of tables including logarithms of numbers, a mortality table, compound amount, present value amount of an annuity, amount of an annuity, and a table of powers, roots and reciprocals. Answers to the odd-numbered exercises are given. Others can be obtained on request.

The type and press-work are excellent, as are also the 57 figures in the text.

VIRGIL SNYDER

NEW BOOKS RECEIVED

Navigation. By L. M. Kells, W. F. Kern, and J. R. Bland. New York and London, McGraw-Hill Book Co., Inc., 20+479 pages. $3.75.

Vectors and Matrices. By C. C. MacDuffee. (Carus Mathematical Monographs, no. 7.) Ithaca, New York, Mathematical Association of America, 1943. 9+192 pages. $2.00.

Methoden der mathematischen Physik. By R. Courant and D. Hilbert. New York, Interscience Publishers, Inc. Reprint of Vol. 1, 1931; Vol. 2, 1937. 15+469+19+549 pages. Vol. 1, $8.00; Vol. 2, $8.00. Vols. 1 and 2, $14.00.

Business Mathematics for College Students. By G. S. Whiteskee. New York and London, McGraw-Hill Book Co., Inc., 1943. 12+184 pages. $1.50.

Navigational Trigonometry. By P. R. Rider and C. A. Hutchinson. New York, The Macmillan Company, 1943. 9+232 pages. $2.00.

Clear Thinking. By L. H. Schnell and M. Crawford. New York and London, Harper and Brothers, 1943. 14+358 pages. $1.96.

Solid Geometry and Spherical Trigonometry. By H. L. Leighton. New York, D. Van Nostrand Co., Inc., 1943. 19+210 pages. $2.20.

Plane Trigonometry. By A. W. Weeks and H. S. Funkhouser. New York, D. Van Nostrand Co., Inc., 1943. 8+193 pages. $1.75.

Calculus. By L. M. Kells. New York, Prentice-Hall, Inc., 1943. 8+509 pages. $3.75.

Random Sampling Distributions. By A. E. Treloar. Minneapolis, Burgess Publishing Co., 1942. 84 pages. $2.25.

Correlation Analysis. By A. E. Treloar. Minneapolis, Burgess Publishing Co., 1942. 96 pages. $1.50.

Analytic Geometry. By F. H. Steen and D. H. Ballou. Boston, Ginn and Co., 1943. 8+206+9 pages. $2.40.

PROBLEMS AND SOLUTIONS

EDITED BY OTTO DUNKEL, ORRIN FRINK, JR., AND H. S. M. COXETER

ELEMENTARY PROBLEMS

Send all communications concerning Elementary Problems and Solutions to H. S. M. Coxeter, 24 Strathearn Boulevard, Toronto 10, Canada.

The department of Elementary Problems welcomes problems believed to be new, and demanding no tools beyond those ordinarily furnished in the first two years of college mathematics. To facilitate their consideration, solutions should be submitted on separate, signed sheets, within three months after publication of problems.

PROBLEMS FOR SOLUTION

E 601. *Proposed by C. T. Tobin, St. Francis Xavier College, Antigonish, N. S.*

A baseball league is formed by seven teams belonging to towns located one mile apart around a circular railroad. In order that each team shall play each other, three games are held every day for a week. No team plays in any town more than once, nor plays more than one game a day. In each town, there is no more than one game a day, and there are never games on two consecutive days. There are no home games. At night each team travels to the scene of the next day's game, by the shortest route along the circular railroad. (Trains run in both directions.) A team that is going to be idle on any day returns (or remains) home the preceding night. When a team has completed its schedule, it returns home that night. The first games are played on Sunday; so the travelling starts on Saturday night and is completed on the following Saturday night. The towns are 1, 2, 3, 4, 5, 6, 7, though not in that order. Teams 3, 5, 6, never travel more than 2 miles any night. Teams 3, 4, 7 all travel the same total number of miles during the schedule. Teams 4 and 6 play at town 5 on Friday, and on that day there is also a game played at town 1.

From the above information, find the order of towns along the railroad, and draw up the schedule of games.

E 602. *Proposed by V. Thébault, San Sebastián, Spain*

With the ten different digits, taken once each, form two numbers which are respectively the square and the cube of two consecutive multiples of 3.

E 603. *Proposed by Free Jamison, U. S. Navy Air Navigation School*

Is there any numerical solution of E 552 [1943, 563] with $4<b<c<33800$?

E 604. *Proposed by H. W. Becker, Mare Island Training Division*

Give a combinatorial proof that

$$\sum_{r=0}^{\infty} \frac{1}{(r!)^2}\left(\frac{t}{2}\right)^{2r} \sim \frac{e^t}{\sqrt{2\pi t}} \quad \text{as} \quad t \to \infty.$$

E 605. *Proposed by L. M. Kelly, U. S. Coast Guard Academy*

Show that, if a set of four coplanar points has the property that the circumcircles of all subsets of three are equal, then the set is orthocentric. Establish the existence of an analogous set of five points in space, i.e., such that the circumspheres of all subsets of four are equal.

SOLUTIONS

The Incompatible Mechanics

E 565 [1943, 200]. *Proposed by H. W. Becker, Mare Island Training Division*

Show that the number of ways n men can be divided up in crews is N_n, in the notation of E 461 [1941, 701]. What is the number of ways if two particular men cannot stand the sight of each other, and must be kept in different crews? What is it if one must be segregated from each of m others?

Solution by D. H. Browne, Buffalo, N. Y. It is understood that, in the division of n men into r crews, some crews may contain more men than others. The number of such divisons is easily seen to be

$$\frac{\Delta^r 0^n}{r!}.$$

Summing for $r=1, 2, \cdots, n$, we obtain the desired number N_n.

Thus, for four men we have 1 crew ($ABCD$), 7 divisions into two crews (AB, CD; AC, BD; AD, BC; A, BCD; etc.), 6 divisions into three crews (AB, C, D; *etc.*) and 1 division into four crews: $N_4=15$ divisions altogether.

If one man is incompatible with one other, we have to subtract the N_{n-1} crew-divisions in which the two incompatibles occur together, leaving $N_n-N_{n-1}=\Delta N_{n-1}$, or, in Steffensen's notation,

$$\nabla N_n.$$

Similarly, if the incompatibility extends to m men in the group, the number of divisions is

$$\nabla^m N_n.$$

Also solved by the proposer.

The Regular Triacontagon

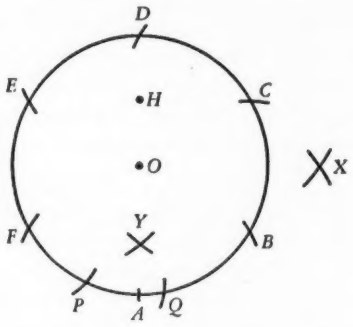
E 567 [1943, 260]. *Proposed by V. Thébault, San Sebastián, Spain*

Using compasses alone, construct a regular polygon of thirty sides.

Solution by E. P. Starke, Rutgers University. Draw a circle (O) with radius 1. Choose a point A on (O) and lay off on (O) the points B, C, D, E, F such that $AB=BC=CD=DE=EF=FA=1$. Locate an intersection X of the two circles having centers A and D and common radius equal to AC. Locate the intersection Y, within (O), of the two circles having centers C and E and common radius equal to OX. Lay off on (O) the points P, Q, such that $FP=PQ=OY$ and

P is between F and A. Then AQ is a side of the regular triacontagon.

To prove the construction, we have $AX=DX=AC=CE=\sqrt{3}$ and $CY=EY=OX=\sqrt{2}$. Let H be the midpoint of CE. Then $HC=\frac{1}{2}\sqrt{3}$ and $HO=\frac{1}{2}$. In the right triangle CHY, CY and HC are known, whence $HY=\frac{1}{2}\sqrt{5}$. Thus $OY=HY-HO=\frac{1}{2}(\sqrt{5}-1)=2 \sin 18°$, which is the length of the side of an inscribed regular decagon. Finally, FQ subtends $\frac{1}{5}$ of the circumference while FA of course subtends $\frac{1}{6}$. Hence AQ subtends $\frac{1}{5}-\frac{1}{6}=1/30$, as required.



We note that the arc AQ has been constructed by the use of eleven circles having four different radii.

Also solved by Howard Eves, using twenty circles with nine different radii.

The Cardioid as an Envelope

E 569 [1943, 260]. *Proposed by David Matlack, Grinnell College*

Through a fixed point A on a circle (O), a line is drawn, parallel to a variable radius OP, meeting the circle again at Q. Find the envelope of the chord PQ.

Solution by E. P. Starke, Rutgers University. In the circle $x^2+y^2=1$, let the coordinates of A, P, Q be respectively

$$(-1, 0), \quad (\cos t, \sin t), \quad (\cos 2t, \sin 2t).$$

The equation of the chord PQ is easily reduced to

$$x(\sin 2t - \sin t) - y(\cos 2t - \cos t) - \sin t = 0.$$

If this is differentiated partially with respect to t, we have

$$x(2 \cos 2t - \cos t) + y(2 \sin 2t - \sin t) - \cos t = 0.$$

The equation of the envelope of PQ could be obtained by eliminating t between these two equations; but it seems easier to solve for x and y, obtaining thus the parametric equations of the curve. We find, after various simplifications,

$$x = (\cos 2t + 2 \cos t)/3, \qquad y = (\sin 2t + 2 \sin t)/3.$$

This is a cardioid. If the origin is translated to $(-\frac{1}{3}, 0)$ the equation in polar coordinates is easily found to be

$$r = \tfrac{2}{3}(1 + \cos\theta).$$

Also solved by D. H. Browne, J. H. Butchart, and Howard Eves.

ADVANCED PROBLEMS

Send all communications about Advanced Problems and Solutions to Otto Dunkel, Washington University, St. Louis, Mo. All manuscripts should be typewritten, with double spacing and with margins at least one inch wide.

Problems containing results believed to be new or extensions of old results are especially sought. The editorial work would be greatly facilitated, if, on sending in problems, proposers would also enclose any solutions or information that will assist the editors in checking the statements. In general, problems in well known text-books or results found in readily accessible sources will not be proposed as problems for solution in this department. In so far as possible, however, the editors will be glad to assist members of the Association in the solution of such problems.

PROBLEMS FOR SOLUTION

4104. *Proposed by E. T. Bell, California Institute of Technology*

Two symmetric functions, $M(x_1, \cdots, x_n)$, $S(x_1, \cdots, x_n)$, of n non-negative integers $x_1, \cdots, x_n$ are defined as follows

$$M(x_1, \cdots, x_n) \equiv M'(x_1) \cdots M'(x_n),$$

in which $M'(x) = 1, -1, 0$, according as $x = 0, x = 1, x > 1$; if $S_j(x_1, \cdots, x_n)$ is the jth elementary symmetric function of $x_1, \cdots, x_n$,

$$S(x_1, \cdots, x_n) \equiv 1 + \sum_{j=1}^{n} jS_j(x_1, \cdots, x_n).$$

Prove that

$$\sum M(x_1 - b_1, \cdots, x_n - b_n)S(b_1, \cdots, b_n) = n,$$

where the summation refers to all integers b_i such that

$$0 \leqq b_i \leqq x_i, \qquad i = 1, 2, \cdots, n.$$

4105. *Proposed by J. H. Butchart, Grinnell College*

Let ρ, ρ_s, R be respectively the radius of curvature of a curve, the radius of curvature of the locus of the center of the osculating sphere, and the radius of this sphere. Then the radius of geodesic curvature ρ_g of the locus of the center of curvature with regard to the polar developable is given by $\rho_g = R^3/(2R^2 - \rho\rho_s)$.

4106. *Proposed by N. A. Court, University of Oklahoma*

If the Monge point of a tetrahedron lies on the circumsphere, show that (a) The line joining the circumcenter to the centroid of a face is equal to half the corresponding median of the tetrahedron; (b) Each median subtends a right angle at the Monge point. Conversely.

4107. *Proposed by V. Thébault, San Sebastián, Spain*

Let $N=123\cdots(n-3)(n-2)n$ be a number of $n-1$ digits in order of increasing magnitude in the system of base $n+1$. The product $P=N\cdot L$ is formed where $L=\alpha\beta$ consists of two digits whose sum $\alpha+\beta=\gamma$ is less than n and δ is the greatest common divisor of n and γ. Show that

$$P = N\cdot L = ab\cdots pqab\cdots pq\cdots ab\cdots pq,$$

where the δ periods $ab\cdots pq$ are formed by n/δ distinct digits.

Dedicated to E. P. Starke.

SOLUTIONS

Perfect Square Integers

4054 [1942, 549]. *Proposed by V. Thébault, San Sebastián, Spain*

Find the base less than 100 for which the number 2101 is a perfect square.

Solution by Irving Kaplansky, Cambridge, Mass. In the base r, the number is $2r^3+r^2+1=s(r+1)$, where $s=2r^2-r+1$. The H. C. F. of $r+1$ and s is a divisor of 4, so that they are either both squares or both doubles of squares. With $r=n^2-1$, $n=2$ or 3 are solutions and $n=4,\cdots,10$ can be rejected by direct test or as follows. Modulo 11, $n\equiv\pm4$ or ±5 makes $s\equiv7$, a non-residue; modulo 17, $n\equiv\pm7$ or ±8 makes $s\equiv5$, a non-residue. With $r=2m^2-1$, $2s$ must be a perfect square; but $m\equiv0$ (3) yields $2s\equiv2(3)$, a non-residue, while $m\equiv$ 2, 4, 5, 7 (17) yields $2s\equiv-3$, 10, 5, 10 (17), respectively, all non-residues. Hence we reject $m=2,\cdots,7$. Hence the only solutions with $r<100$ are $r=3$, 8. With the above congruences and a few others, it was easy to verify that there are no further solutions with $r<10{,}000$.

Solved also by the proposer giving the two answers without his method.

Editorial Note. It will be shown that, if $s=2r^2-r+1=2y^2$, the only solution is $r=1$ which is excluded. Solving for r we find that $4r=1+x$, where $16y^2-x^2=7$, or $4y+x=7$, $4y-x=1$, discarding negative values. This yields as the only positive integral solution $x=3$, $y=1$, $r=1$. We now turn to the only other case where $s=y^2$, and proceeding in the same manner we find that

$$x^2-8y^2=-7; \tag{1}$$

$$4r=1+x; \tag{2}$$

and we shall show how to find in succession all the positive integral solutions of (1). It is easily verified that, if x, y is an integral solution of (1), so are also x', y', and x'', y'', where

$$\begin{aligned} x' &= 3x+8y, \\ y' &= x+3y, \end{aligned} \tag{3}$$

$$\begin{aligned} x'' &= 3x-8y, \\ y'' &= 3y-x, \end{aligned} \tag{4}$$

and (4) is the inverse of (3). If x, y are both positive then y'' is also positive; and, if also $x \geqq 11$, then x'' is positive, and we have a positive solution in x'', y'' with $x'' < x$, $y'' < y$. If on the other hand x, y is a positive solution with $x < 11$ then x'' is negative and y'' is positive. With these facts it may be shown that the following process gives all of the positive solutions. From the solution 1, 1 of (1) we get from (4) the positive solution 5, 2, after change of sign of the x; and from (3) we get the solution 11, 4, We now use (3) and the last pair of solutions, to obtain a second pair 31, 11 and 65, 23; this second pair with (3) gives a third pair, and so on. We must reject 5, 2 and 65, 23 since $x \not\equiv -1 \bmod 4$, and in each pair one solution must be rejected for the same reason. We eliminate the rejected solutions by using the result of two applications of (3) which is

$$x''' = 17x + 48y, \qquad y''' = 6x + 17y,$$

applied to 11, 4 and 31, 11; and finally we put this transformation in the form

$$\begin{gathered} x_{i+4} = 34x_{i+2} - x_i, \qquad y_{i+4} = 34y_{i+2} - y_i, \qquad t_{i+4} = 34t_{i+2} - t_i - 40, \\ 4t_i = x_i + 5, \qquad r_i = t_i - 1, \end{gathered} \tag{5}$$

where x_1, y_1 is 11, 4 and the following solutions are arranged in the order

x:	11	31	379	$1055 \cdots$,
y:	4	11	134	$373 \cdots$,
t:	4	9	96	$265 \cdots$.

We have a solution of the problem if and only if t is a perfect square. For convenience we set $t_0 = 1$ and then the values of t_i may be computed in turn from t_0, t_1, t_2, t_3. By the use of quadratic residues, denoting a non-quadratic residue by N. R., it may be shown that there are only two solutions of the problem for r or t less than $4 \cdot 10^{37}$. For (7), *i.e.*, mod 7, we have at once $t_{i+4} \equiv -t_{i+2} - t_i - 5$, $t_{i+6} \equiv t_i$; and then we find that the N. R. (7) are given by the t's with the subscripts $6k+3$, $6k+4$, $k = 0, 1, 2, \cdots$. In a similar manner we have N. R. for

$$t_{12k+3,5,6,8,10}(11); \qquad t_{14k+3,4,9,10,11,12}(13);$$
$$t_{8k+3,4,5}(17); \qquad t_{20k+4,6,7,8,9,11,12,14,15,17}(19).$$

These five expressions give the subscripts from 3 to 49 inclusive but not 50.

Explicit formulas for t_i are as follows

$$t_{2j} = \left(\frac{2\sqrt{2} - 1}{8}\right)(17 + 12\sqrt{2})^j - \left(\frac{2\sqrt{2} + 1}{8}\right)(17 - 12\sqrt{2})^j + \frac{5}{4}, \tag{6}$$

and for t_{2j+1} replace the coefficients of the two jth powers by $(11+8\sqrt{2})/8$ and $-(8\sqrt{2}-11)/8$. Using only the first term of (6) we have approximately $t_{50} = 4.3308 \cdot 10^{37}$. If we consider also (23) it will be found that there are only two solutions for $r < 6.65 \cdot 10^{46}$. While these limits are quite large it would be much more interesting to have a process for determining whether or not there are more than two solutions.

NEWS AND NOTICES

Readers are invited to contribute to the general interest of this department by sending news items to B. W. Jones, White Hall, Cornell University, Ithaca, New York.

Dr. G. E. Albert of Ohio State University has been promoted to an assistant professorship.

Dr. Warren Ambrose of Princeton University has been appointed to an assistant professorship at the University of Michigan.

Assistant Professor Max Astrachan of Antioch College has been promoted to an associate professorship and to the chairmanship of the department of mathematics.

Assistant Professor R. H. Bardell, chairman of the mathematics department of the University of Wisconsin at Milwaukee, is now acting director of that institution.

Assistant Professor A. F. Bernhart of Bucknell University has been appointed to an assistant professorship at the University of Oklahoma.

Drs. O. K. Bower, Leonard Bristow, M. M. Day and J. W. Peters of the University of Illinois have been promoted from the rank of instructor to that of associate.

Assistant Professors D. G. Bourgin, J. L. Doob, P. W. Ketchum and G. E. Moore of the University of Illinois have been promoted to associate professorships.

Assistant Professor M. G. Boyce of Western Reserve University has been promoted to an associate professorship.

Assistant Professors J. D. Burk and G. de B. Robinson of the University of Toronto have been promoted to associate professorships. The latter is on leave with the National Research Council, Ottawa.

Assistant Professor C. L. Buxton of Clarkson College of Technology has been promoted to the rank of associate professor of physics.

Professor Helen Calkins of Pennsylvania College for Women has been appointed lecturer at the University of Minnesota.

Assistant Professor R. H. Cameron of Massachusetts Institute of Technology has been promoted to an associate professorship.

Associate Professor E. J. Camp of Macalester College, St. Paul, has been promoted to a professorship.

Associates Josephine H. Chanler and H. J. Miles of the University of Illinois have been promoted to assistant professorships.

Drs. R. F. Clippinger and A. D. Hestenes of Carnegie Institute of Technology have been promoted to assistant professorships.

Assistant Professors N. B. Conkwright and L. A. Knowler of the University of Iowa have been promoted to associate professorships.

Professor J. A. Cooley of the University of Tennessee has been appointed head of the department.

Associate Professor T. F. Cope of Queens College has been appointed chairman of the department.

W. S. H. Crawford of the University of Minnesota has been appointed to an assistant professorship at Mt. Allison University, Sackville, New Brunswick.

J. C. Currie of Northeast Junior College of Louisiana State University has been promoted to an assistant professorship.

Associate Professor Wayne Dancer of the University of Toledo has been promoted to a professorship.

Associate Professor P. H. Daus of the University of California at Los Angeles has been promoted to a professorship.

Associate Professor J. E. Davis of the Central Y.M.C.A. College of Chicago has been appointed to the rank of associate in Pharmacy at the University of Illinois in Chicago.

U. P. Davis of the University of Florida has been promoted to an assistant professorship.

Associate Professor D. C. Dearborn at Catawba College, Salisbury, North Carolina, has been promoted to a professorship.

Professor R. C. Dragoo of Southern Institute of Technology (Oklahoma) has been appointed to an assistant professorship at the University of Oklahoma.

Assistant Professors L. T. Dunlap and H. L. Krall have returned to the Pennsylvania State College after service with the armed forces.

Associate Professor W. L. Duren, Jr. of Tulane University has been promoted to a professorship.

Associate Professors H. H. Germand and J. H. Kusner, Assistant Professor E. S. Quade, and Instructors R. D. Specht and T. S. George of the University of Florida are on leave in the armed services or in war work.

Assistant Professors W. O. Gordon, Evan Johnson, Jr., and W. O. Rogers of the Pennsylvania State College have been promoted to associate professorships.

Majors V. S. Lawrence and H. A. Robinson of the United States Military Academy have been promoted to the rank of lieutenant colonel.

Dr. A. T. Lonseth of the Iowa State College has been promoted to an assistant professorship.

Assistant Professor Neil Little of Purdue University now holds the same rank in the department of applied mechanics in that institution.

H. G. Means has been appointed to an associate professorship at Lehigh University.

Assistant Professor S. B. Myers of the University of Michigan has been promoted to an associate professorship.

Assistant Professor J. C. Oxtoby of Bryn Mawr College has been promoted to an associate professorship.

Dr. H. V. Price of the State University of Iowa has been promoted to an assistant professorship.

Associate Professor W. C. Randels of the University of Oklahoma has resigned to serve with the North America Aviation Company in Los Angeles.

Professor S. E. Rasor of Ohio State University has retired.

Professor H. W. Reddick of Cooper Union has been appointed adjunct professor of mathematics at New York University.

Assistant Professor George Sauté of Cleveland College has been appointed to an associate professorship at Rollins College.

Assistant Professor A. C. Schaeffer of Stanford University has been promoted to an associate professorship.

Dr. H. M. Schwartz of the University of Illinois has been appointed to an assistant professorship at the University of Idaho.

Associate Professor D. T. Sigley of Kansas State College is on leave of absence in war work at Silver Springs, Maryland.

Professor Emeritus Virgil Snyder of Cornell University is teaching at Rollins College.

Assistant Professor H. P. Thielman of the Iowa State College has been promoted to an associate professorship.

Professor C. B. Upton of Teachers College in Columbia University has been elected chairman of the board of the American Book Company.

Dr. P. R. Wallace of Massachusetts Institute of Technology is on leave of absence serving with the National Research Council of Canada.

Dr. George Whapples of Johns Hopkins University has been appointed to an assistant professorship at the University of Pennsylvania.

Associate Professor J. K. Whittemore of Yale University has retired.

The following appointments to instructorships are announced:
Barnard College: Louise Comer
Columbia University; mathematical assistant: Dr. George Piranian
Cornell University: Teaching assistants: Gunter Jahn, Irma R. Moses, A. E. Ventriglia
DePaul University (Chicago): Paul D'Arco
Greenbrier College: Margaret R. Davis
Kansas State College: W. V. Unruh, L. E. Milleson, D. K. Brooks
Lehigh University: R. C. King, S. W. Smith
Massachusetts Institute of Technology: W. S. Loud, Donald Thomson
Ohio State University: L. H. Miller
Pennsylvania State College: J. R. Kinney, Mrs. Nellie M. Krall
Purdue University: H. M. Anderson, F. C. Leone
Stanford University: Marjorie L. Hoffman, Mary V. Sunseri
University of Chicago: Dr. Anne L. Lewis, Dr. Janet MacDonald
University of Illinois: W. F. Atchison, Janie C. Lapsley
University of Kentucky: Mary H. Cooper, Mrs. J. C. Lamb, Mrs. C. G. Latimer
University of Michigan: Dr. B. J. Lockhart, Dr. C. A. Truesdell
University of Minnesota: H. D. Colson
University of Oklahoma: Phyllis Barclay, Mrs. Dorothea A. Sudduth
University of Pennsylvania: S. I. Askovitz, R. C. Cambell, Dr. H. D. Huskey C. W. Pflaum
Yale University: J. S. Blair, J. C. Caughlin, A. S. Day, R. E. Fullerton, Dr. W. C. G. Fraser, C. R. Kossack, J. R. Lee, Jr., J. S. Leech, J. G. Pocock, P. E. Poe, James Smillie, W. J. Strange

Professor Emeritus H. H. Dalaker of the Institute of Technology at the University of Minnesota died May 20, 1943. He was a charter member of the Mathematical Association.

Professor Leonard Richardson of the University of British Columbia died on October 23, 1943.

WAR INFORMATION

EDITED BY C. V. NEWSOM

Send news reports upon the utilization of mathematicians or mathematics in war activities to C. V. Newsom, University of New Mexico, Albuquerque, New Mexico.

NOTES FROM THE WAR DEPARTMENT

Pre-Induction Training. Civilian pre-induction training is to become part of the individual's military record when he is inducted into the Army, it has been announced by the War Department. This is to be accomplished by entering the selectee's pre-induction training experience upon his personal qualification card, which records his military qualifications and career, and follows him throughout his service.

Approximately 600,000 prospective inductees were enrolled last year in pre-induction training courses according to Merwin M. Peake, Director of the Civilian Pre-Induction Training Branch. It is to be emphasized that students who take such courses build a valuable basis for Army specialist training after their induction. "At the present time," Mr. Peake said, "900 out of every 1,000 men inducted must fill Army jobs requiring specialized training, as compared to but 630 men in every 1,000 only one year ago. In stressing vocational training, the War Department also emphasizes the great importance of basic education, especially in the fields of mathematics, English and social studies, as preparation for Army life. All men entering the Army should know why we are at war, be competent in basic mathematics and English, learn in advance what Army life is like, and be physically fit. Schools and other civilian training agencies can promote the nation's war effort by providing potential Army inductees with training in these fields."

A.S.T.P. Certificates. Certificates will be awarded to all soldiers who successfully complete their prescribed work in the Army Specialized Training Program at colleges and universities, the War Department announced in September. The certificate will list the curriculum number in which the soldier performed his work, the number of terms completed, and the date the training was completed; it will be signed by the appropriate authority at the college attended and by the Commandant of the Army Specialized Training Unit at that college. Certificates will be executed and forwarded to all enlisted men who have already successfully completed their work in the A.S.T.P.

The record of the soldier's performance will also be available at the university, on request by appropriate authority, for the purpose of determining his academic credit. In the opinion of the A.S.T.P. Advisory Committee, comprised of presidents of ten leading colleges and universities, all A.S.T.P. academic work is at the college level. It is anticipated, therefore, that appropriate college credits will be granted, enabling the soldier-trainee to complete his work for a

college degree if he returns to college as a civilian after the termination of his military service.

Deferment of A.S.T.P. Teachers. The following is a direct quotation from a notice sent to presidents of institutions participating in the Army Specialized Training Program.

"It is of the utmost importance that qualified and irreplaceable teachers who are at institutions under contract to the Army Specialized Training Program and who are providing instruction under the program be permitted to continue this work.

"The requirements of the Army Specialized Training Program indicate that very serious disruption is probable if the responsible officials of these institutions do not sufficiently emphasize to Selective Service Authorities the necessity for the occupational deferment of these teachers.

"As a first step, it is requested that all teachers in institutions under contract to the Army Specialized Training Program register their qualifications with the National Roster of Scientific and Specialized Personnel, Washington, D. C. The National Roster is concerned with the proper utilization of professional personnel and is an important source of information in this matter to the Selective Service System.

"The Selective Service Form 42-A, completely filled out, should be used for individual teachers for whom deferment is considered necessary, to furnish the appropriate local board with specific information reflecting the considered judgment of the institution with respect to qualifications, degree of training, and experience required to engage in the profession; and to inform the board either (1) that no replacement can be obtained and that replacement training time is too great to afford relief, or (2) that no replacement can be obtained immediately, in which case the time required for replacement should be indicated. Special attention should be devoted to furnishing complete information concerning the capacities and duties of the individual teacher. In cases where teachers can be replaced, it should be emphasized that the replacement should not break into the term during which the incumbent teacher is giving instruction.

"It is essential that all possible means of procuring replacement be employed, including the transfer of non-vulnerable teachers who are engaged in civilian training, the conversion of teachers from cognate fields or from administrative duties, the recruitment of teachers not now engaged in essential activities, and in general the maximum practical use of existing teaching personnel.

"Where deferment is not obtained at the local board level, appeal should be made within ten days to the area or district appeals board and if necessary the case should be called to the attention of the State Director with a request for a Presidential appeal.

"You are requested to adhere strictly to all Selective Service procedures regarding occupational deferment. You are also requested to advise the Military

Commandant of your institution immediately when any irreplaceable teacher is classified by Selective Service authorities as available for military service.

"In the event that the Military Commandant at the institution considers the deferment of the teacher to be essential to the success of the Army Specialized Training Program, representations to that effect may be made by him to the State Director of the Selective Service System. Such representations are not to be made, however, unless all appeal procedure provided under the Selective Service Act is being pursued and unless in fact the particular teacher is irreplaceable in the institution.

"In the event that the deferment is denied after all appeal steps through the state level have been complied with, the institution should immediately transmit the matter to the Labor Branch, Industrial Personnel Division, Headquarters, Army Service Forces, for representations at the Washington level.

"In the case of the irreplaceable teacher whose induction into the Army has taken place, causing serious jeopardy to the Army Specialized Training Program, institutions may submit a full statement of the facts to the Labor Branch, Industrial Personnel Division, Headquarters, Army Service Forces, Washington, D. C., for consideration of methods for remedial action."

THE COLLEGE PRE-FLIGHT PROGRAM

The College Training Program (Aircrew) of the Training Command of the Army Air Forces was established to give preliminary training to the lowest 80% of those prospective aviation cadets who have passed the screening test given by the Air Forces; upon graduation from the College Program, trainees are sent to an Army Pre-Flight School. Men in the upper 20% are sent directly to Army schools, and receive no specialized college training.

In spite of the screening test, a considerable number of men in the Program have little mathematical background, and sectioning of the students on the basis of ability is becoming common in many institutions. A similar situation is appearing in all the Army and Navy Educational Programs.

The curriculum recommended for the Army Aircrew Program includes a course in mathematics designed for eighty class hours, spread over a period of approximately sixteen weeks. The topical outline of the course in mathematics provided by the Training Command includes the following introduction.

"The topics listed in the . . . outline are mainly those needed directly by the student as a basis for subsequent training. There are some, however, which are given for background material. The presentation should be from the standpoint of preparation for aircrew training, with as much time as possible spent on supervised drill. Assignment of problems to be done outside of class is recommended. Examinations should be of the open-book type. The emphasis on theory should be limited to the minimum essential to enable the students to appreciate the content of the course. Applications of numerical operations should be emphasized whenever possible."

An abridgment of the recommended course outline appears below.

Unit 1. ARITHMETIC. Fourteen hours.

Addition, subtraction, multiplication and division of whole numbers; the use of hours, minutes, seconds; degrees, minutes, seconds, radians; circular and Air Corps mils; English measure; metric measure; the relations between different measures; common and decimal fractions; percentage; ratio and proportion; conversion tables. Emphasis should be placed on speed and accuracy in numerical computations. It is suggested that drill for speed be given, and tests designed accordingly.

Unit 2. ALGEBRA. Twenty hours.

The content should be selected from any reputable college text to emphasize the manipulative skills needed for numerical trigonometry, physics, and the elementary technical fields; graphical methods should be introduced. Practical problems in time, speed, distance, and fuel consumption should be especially emphasized. Statement problems should be given wherever practicable to exercise the student's ability to think.

Unit 3. GEOMETRY. Eighteen hours.

This course should be designed to create accurate conceptions of space on the part of the student, and to prepare him for trigonometry and certain phases of astronomy. The content should include a treatment of straight lines, planes, dihedral and trihedral angles, and the geometry of the sphere; other major parts of the usual geometry course may be omitted. Proofs should be held to a minimum; great emphasis should be placed on the drawing of figures and the making of simple tridimensional paper models. Content which will be used in spherical trigonometry should receive particular attention.

Unit 4. TRIGONOMETRY AND LOGARITHMS. Twenty-eight hours.

This is primarily a course in the numerical aspects of trigonometry with only that amount of analytical trigonometry which is essential for the solution of practical problems. Substantial emphasis should be given to slide-rule computation, stressing applications, especially those involving vector forces and velocities in problems peculiar to military service. Formulas for the solution of the right triangle and the general triangle on the celestial sphere should be treated. A major objective of the course is to give the student confidence in the later use of navigation tables, which frequently makes it unnecessary for the navigator to carry out the solution of spherical triangles.

THE PAPER SHORTAGE

Publishers in the United States are facing the apparent dilemma of an increasing shortage of paper and a rising demand for books. A very few publishing houses have already introduced rationing programs, but not of technical books of current importance. The policy generally is to produce more books out of less paper, and this will be increasingly evident in the books' appearance.

Through 1943, publishers were permitted to receive up to 90% of the paper which they used in 1942. Mr. H. M. Bitner, Director of the Printing and Publishing Division, War Production Board, has warned, however, that "a curtailment may be expected as of January 1, 1944, and that it will include the book industry's share of the general cut levied against the graphic arts." Mr. M. K. Dutton, also of the War Production Board, has asserted that another cut of possibly 10% should be anticipated, since inventories of wood-pulp are down as much as 33%.

Consequently, every skill at the command of the paper mills is being called upon to produce good printing papers at the lower weights. Also, publishers have developed model pages which permit more words on the page. Smaller print and smaller margins are becoming common, and there is considerable discussion in regard to the introduction of the two-column page into technical books. By the use of similar devices, the Federal Government has been able to curtail its use of paper by 25%.

CALENDAR OF FUTURE MEETINGS

The following is a list of the Sections of the Association with dates of future meetings so far as they have been reported to the Secretary.

ALLEGHENY MOUNTAIN, Pittsburgh, Pa., April, 1944
ILLINOIS
INDIANA
IOWA
KANSAS
KENTUCKY
LOUISIANA-MISSISSIPPI, Ruston, La.
MARYLAND-DISTRICT OF COLUMBIA-VIRGINIA
METROPOLITAN NEW YORK, New York, April 22, 1944
MICHIGAN
MINNESOTA
MISSOURI
NEBRASKA
NORTHERN CALIFORNIA, Berkeley, Jan. 29, 1944
OHIO, Columbus, April 6, 1944
OKLAHOMA
PHILADELPHIA, Philadelphia, November, 1944
ROCKY MOUNTAIN
SOUTHEASTERN
SOUTHERN CALIFORNIA, Los Angeles, March 11, 1944
SOUTHWESTERN
TEXAS
UPPER NEW YORK STATE
WISCONSIN, Milwaukee, May, 1944

WIDELY ADOPTED FOR BOTH ARMY AND NAVY PROGRAMS

NELSON, FOLLEY & BORGMAN'S

CALCULUS

An early treatment of the integration as well as differentiation of polynomials, with applications, precedes the treatment of other functions. Now a leading text for ASTP and V12 courses. *366 pages. $2.75*

HART, WILSON & TRACEY'S

FIRST YEAR COLLEGE MATHEMATICS

Essentials of College Algebra; Plane and Spherical Trigonometry with Applications; Analytic Geometry; Tables. *886 pages. $4.00.* A *BRIEF EDITION* (Hart) is identical with the complete edition, except for the omission of the Analytic Geometry section. *606 pages. $3.00*

D. C. HEATH AND COMPANY

Boston New York Chicago Atlanta San Francisco Dallas London

THE CARUS MONOGRAPHS

No. 1. *Calculus of Variations,* by PROFESSOR G. A. BLISS. (First Impression, 1925; Second Impression, 1927; Third Impression, 1935.)

No. 2. *Analytic Functions of a Complex Variable,* by PROFESSOR D. R. CURTISS. (First Impression, 1926; Second Impression, 1930.)

No. 3. *Mathematical Statistics,* by PROFESSOR H. L. RIETZ. (First Impression, 1927; Second Impression, 1929; Third Impression, 1936.)

No. 4. *Projective Geometry,* by PROFESSOR J. W. YOUNG. (First Impression, 1930; Second Impression, 1938.)

No. 5. *History of Mathematics in America before 1900,* by PROFESSORS DAVID EUGENE SMITH and JEKUTHIEL GINSBURG. (First Impression, 1934.)

No. 6. *Fourier Series and Orthogonal Polynomials,* by PROFESSOR DUNHAM JACKSON. (First Impression, 1941.)

No. 7. *Vectors and Matrices,* by PROFESSOR C. C. MACDUFFEE. (First Impression, 1943.)

Price $1.25 per copy to members of the Mathematical Association, one copy to each member, when ordered directly through the office of the Secretary, MCGRAW HALL, Cornell University, ITHACA, N.Y.

Additional copies for members, and copies for non-members, may be purchased from the Open Court Publishing Co., La Salle, Illinois, at the regular price of $2.00 per copy.

Raymond W. Brink's

A FIRST YEAR OF COLLEGE MATHEMATICS

"Remarkable for its adequate treatment of so many topics."
—Hammond Pride, New York University.—

655 pages price $3.75

D. APPLETON-CENTURY COMPANY
35 West 32nd St. New York 1, N.Y.

New Books

ARITHMETIC FOR ADULTS: A Review of Elementary Mathematics
By Aaron Bakst

Simple explanations which are almost startling in their ability to clarify the essential mathematical concepts characterize this book which is planned to give the grown person a grasp of the problems of numbers. No part of the subject (it continues through simple algebra) is too obvious for full explanation.

This book has a real function in opening fields of interest and knowledge to the student who is hampered by poor preparation in mathematics.

318 pages *Crown octavo* *To be published in February*

ANALYTIC GEOMETRY

By K. B. Patterson and A. O. Hickson, *Duke University*

A concise and thorough text for a three-hour semester course. Its treatment is notably clear and logical. The unusually large number of figures and the many exercises and problems make it an excellent preparation for satisfactory work in the calculus.

187 pages *Crown octavo* *Published in January*

F. S. CROFTS & CO. 101 Fifth Avenue, New York 3, N.Y.

ANALYSIS

MATHEMATICAL REVIEWS

offers

prompt review of the mathematical literature of the world
complete subject and author indices in last issue of volume
microfilm or photoprints of most articles reviewed (at cost)

at the very low rate of $13 per year

Publication of this journal is sponsored by the American Mathematical Society, Mathematical Association of America, London Mathematical Society, Academia Nacional de Ciencias de Lima, Union Matematica Argentina and others.

Send subscription order or request for sample copy to

American Mathematical Society, 531 West 116th Street, New York City 27

A COMPLETE REFERENCE BOOK

for college students in trigonometry through calculus

THE JAMES MATHEMATICS DICTIONARY

provides:

the facts the student has learned in presupposed subjects, the forgetting of which causes most of his current difficulties;

correlation between his various subjects by means of its carefully worked out cross-reference system;

tables—logarithmic; trigonometric; differentiation; extensive integral; denominate numbers; mathematical symbols; squares and cubes, and mathematics of finance.

Attractive format, durable fabricoid binding, either flexible or non-flexible, price $3.00. Fifteen percent discount to teachers. Larger discounts on quantity orders.

THE DIGEST PRESS, Dept. 1A

VAN NUYS CALIFORNIA

An Impressive Record

MIDDLEMISS'

DIFFERENTIAL AND INTEGRAL CALCULUS

By ROSS R. MIDDLEMISS

Associate Professor of Mathematics, Washington University

416 pages, 6 x 9. $2.50

Over 125 institutions have adopted the book and it is the required text at the U. S. Naval Academy and the U. S. Coast Guard Academy. Teachers in Army and Navy college training courses are finding that this leading text covers all the topics listed in the topic outlines for AST-408 and AST-401, and for Navy V-12 courses.

Partial list of adoptions:

University of Akron
Alabama Polytechnic Institute
University of Arkansas
Brown University
University of Colorado
Columbia University
University of Connecticut
Dartmouth College
De Paul University
University of Georgia
University of Illinois
Illinois Institute of Technology
Indiana University
University of Maine
University of Maryland
Massachusetts State College
Michigan College of Mines
Michigan State College
Mississippi State College
Missouri School of Mines
University of Nebraska
New Mexico State College
Northwestern University
Oberlin College
Ohio University
University of South Carolina
University of Southern California
Syracuse University
University of Toronto
Tufts College
Tulane University
Utah State College
Virginia Polytechnic Institute
Washington University
Western Reserve University
University of Wisconsin

Send for a copy on approval

McGRAW-HILL BOOK COMPANY, Inc.

330 West 42nd Street **New York 18, N.Y.**

GEORGE BANTA PUBLISHING COMPANY, MENASHA, WISCONSIN

VISTA

CHNOLOGY DEPT.

THE AMERICAN MATHEMATICAL MONTHLY

OFFICIAL JOURNAL OF

THE MATHEMATICAL ASSOCIATION OF AMERICA

(INCORPORATED)

PUBLIC LIBRARY
MAR 8 1944
DETROIT

VOLUME 51 NUMBER 1

PART II

LIST OF OFFICERS AND MEMBERS

Officers
Alphabetical List of Members
Geographical Distribution of Members
By-laws of the Association
Former Officers

JANUARY 1944

Price 50 cents

The Chauvenet Prize

The Chauvenet Prize for a "noteworthy expository paper published in English during the five-year period by a member of the Association" was established in 1925 by a gift from Professor J. L. Coolidge, then president of the Association. Its frequency period was reduced to three years by an additional gift from Professor W. B. Ford during his presidency and by an anonymous gift in 1936.

As determined more recently by the Board of Governors, the prize is to be fifty dollars and is to be awarded for a noteworthy expository paper such as will come within the range of profitable reading of members of the Association. The purpose of the prize is to stimulate expository contributions in mathematical journals on the part of the younger American scholars. The next two awards will be made in December 1944 and December 1947, covering the periods 1941-43 and 1944-46 respectively.

Six awards have been made as follows:

1920-1924. G. A. Bliss, "Algebraic Functions and Their Divisors," *Annals of Mathematics.*

1925-1928. T. H. Hildebrandt, "The Borel Theorem and Its Generalizations," *Bulletin* of the American Mathematical Society.

1929-1931. G. H. Hardy, "An Introduction to the Theory of Numbers," *Bulletin* of the American Mathematical Society.

1932-1934. Dunham Jackson, "Series of Orthogonal Polynomials" and "Orthogonal Trigonometric Sums," *Annals of Mathematics;* "The Convergence of Fourier Series," *American Mathematical Monthly.*

1935-1937. G. T. Whyburn, "On the Structure of Continua," *Bulletin* of the American Mathematical Society.

1938-1940. Saunders Mac Lane, "Modular Fields," and "Some Recent Advances in Algebra," both in the *American Mathematical Monthly.*

ANTI

THE AMERICAN MATHEMATICAL MONTHLY

OFFICIAL JOURNAL OF

THE MATHEMATICAL ASSOCIATION OF AMERICA

(INCORPORATED)

LIST OF OFFICERS AND MEMBERS

JANUARY 1944

PUBLISHED BY THE ASSOCIATION
MENASHA, WIS., AND CHICAGO, ILL.

MATHEMATICAL ASSOCIATION OF AMERICA

OFFICERS

President, W. D. CAIRNS, Oberlin College (1943–44)
First Vice-President, W. M. WHYBURN, University of California at Los Angeles (1944–45)
Second Vice-President, C. C. MACDUFFEE, University of Wisconsin (1943–44)
Editor-in-Chief, L. R. FORD, Illinois Institute of Technology (1942–46)
Secretary-Treasurer, W. B. CARVER, Cornell University (1943–47)
Associate Secretary, B. W. JONES, Cornell University (1943–47)

ADDITIONAL MEMBERS OF THE BOARD OF GOVERNORS

Ex-Presidents

A. J. KEMPNER, University of Colorado (1939–44)
W. B. CARVER, Cornell University (1941–46)
R. W. BRINK, University of Minnesota (1942–47)

Governors at Large

W. L. AYRES, Purdue University (1942–44)
R. L. WILDER, University of Michigan (1942–44)
SAUNDERS MAC LANE, Harvard University (1943–45)
E. J. MOULTON, Northwestern University (1943–45)
R. G. SANGER, University of Chicago (1944–46)
MORGAN WARD, California Institute of Technology (1944–46)

Regional Governors (representing the fourteen regions)

1. W. F. CHENEY, JR., University of Connecticut (January 1942–July 1944)
2. R. P. AGNEW, Cornell University (January 1942–July 1944)
3. ARNOLD DRESDEN, Swarthmore College (July 1943–July 1945)
4. E. J. MCSHANE, University of Virginia (January 1941–July 1943)
5. H. A. ROBINSON, Agnes Scott College (January 1942–July 1944)
6. W. V. PARKER, Louisiana State University (July 1943–July 1945)
7. C. G. LATIMER, University of Kentucky (January 1942–July 1944)
8. A. L. NELSON, Wayne University (July 1943–July 1945)
9. K. W. WEGNER, Carleton College (July 1943–July 1945)
10. L. M. BLUMENTHAL, University of Missouri (January 1942–July 1944)
11. H. E. BRAY, Rice Institute (July 1943–July 1945)
12. O. H. RECHARD, University of Wyoming (January 1942–July 1944)
13. W. E. MILNE, Oregon State College (January 1942–July 1944)
14. C. G. JAEGER, Pomona College (July 1943–July 1945)

STANDING COMMITTEES OF THE ASSOCIATION

Editorial Committee on Carus Monographs

G. A. Bliss, University of Chicago
D. R. Curtiss, Northwestern University
Dunham Jackson, University of Minnesota
A. J. Kempner, University of Colorado
J. M. Thomas, Duke University
Saunders Mac Lane, Harvard University, *Chairman*

Committee on the Arnold Buffum Chace Fund

R. C. Archibald, Brown University
R. W. Brink, University of Minnesota
W. D. Cairns, Oberlin College
W. R. Longley, Yale University

Finance Committee

W. B. Carver, *ex-officio*
D. R. Curtiss, Northwestern University (1942–1945)
H. M. Gehman, University of Buffalo (1944–1947)

Committee on Section Meetings

W. B. Carver, *ex-officio*
Ruth Mason Ballard, Wright Junior College, Chicago
W. V. Parker, Louisiana State University

Committee on Slaught Memorial Papers

N. H. McCoy, Smith College
W. E. Milne, Oregon State College
C. V. Newsom, University of New Mexico
R. E. Langer, University of Wisconsin, *Chairman*

Conference Committee on Education

D. R. Curtiss, Northwestern University
G. C. Evans, University of California
Tomlinson Fort, Lehigh University
J. J. Gergen, Duke University
J. O. Hassler, University of Oklahoma
W. E. Milne, Oregon State College
I. J. Schoenberg, University of Pennsylvania
Raleigh Schorling, University of Michigan
Marie J. Weiss, Sophie Newcomb College
A. A. Bennett, Brown University, *Chairman*

Representatives on Councils of Scientific Organizations

National Research Council—T. C. Fry, Bell Telephone Laboratories (July 1941–July 1944); R. E. Langer, University of Wisconsin (July 1944–July 1947)
American Association for the Advancement of Science—R. W. Brink, University of Minnesota, and W. D. Cairns, Oberlin College (1944)
American Documentation Institute—G. B. Price, University of Kansas (1942–1944)

Associate Editors of the Official Journal

E. F. Beckenbach, University of Texas
L. M. Blumenthal, University of Missouri
N. B. Conkwright, University of Iowa
H. S. M. Coxeter, University of Toronto
W. M. Davis, Cornell College
Otto Dunkel, Washington University
H. B. Evans, University of Pennsylvania
B. F. Finkel, Drury College
J. S. Frame, Michigan State College
Orrin Frink, Jr., Pennsylvania State College
Marjorie Groves, University of Chicago
M. R. Hestenes, University of Chicago
B. W. Jones, Cornell University
R. E. Langer, University of Wisconsin
C. V. Newsom, University of New Mexico
Virgil Snyder, Cornell University
Marie J. Weiss, Sophie Newcomb College

SECTIONS OF THE ASSOCIATION

Allegheny Mountain

R. G. Sturm, Aluminum Research Laboratories, *Chairman*
H. L. Dorwart, Washington and Jefferson College, *Secretary-Treasurer*

Illinois

E. W. Ploenges, James Millikin University, *Chairman*
C. N. Mills, Illinois State Normal University, *Vice Chairman*
E. C. Kiefer, James Millikin University, *Secretary-Treasurer*

Indiana

Emil Artin, Indiana University, *Chairman*
W. L. Ayres, Purdue University, *Vice Chairman*
M. W. Keller, Purdue University, *Secretary-Treasurer*

Iowa

N. B. Conkwright, University of Iowa, *Chairman*
Cornelius Gouwens, Iowa State College, *Secretary-Treasurer*

Kansas

Paul Eberhart, Washburn University, *Chairman*
Edison Greer, Beech Aircraft Corporation, *Vice Chairman*
Anna Marm, University of Kansas, *Secretary-Treasurer*

Kentucky

Charles Hatfield, Georgetown College, *Chairman*
M. C. Brown, University of Kentucky, *Secretary-Treasurer*

Louisiana-Mississippi

J. A. Ward, Delta State Teachers College, *Chairman*
S. T. Sanders, Jr., Southwestern Louisiana Institute, *Vice Chairman*
B. O. Van Hook, Millsaps College, *Vice Chairman*
W. V. Parker, Louisiana State University, *Secretary-Treasurer*

Maryland-District of Columbia-Virginia

J. H. Taylor, George Washington University, *Chairman*
W. K. Morrill, Johns Hopkins University, *Secretary-Treasurer*

Metropolitan New York

R. M. Foster, Polytechnic Institute of Brooklyn, *Chairman*
Max Peters, New Utrecht High School, *Vice Chairman*
H. E. Wahlert, New York University, *Secretary*
F. H. Miller, Cooper Union, *Treasurer*

Michigan

G. G. Speeker, Michigan State College, *Chairman*
C. J. Coe, University of Michigan, *Secretary-Treasurer*

Minnesota

C. H. Gingrich, Carleton College, *Chairman*
A. L. Underhill, University of Minnesota, *Secretary-Treasurer*

Missouri

R. R. Middlemiss, Washington University, *Chairman*
W. E. Ferguson, University of Missouri, *Secretary-Treasurer*

Nebraska

W. A. Dwyer, Creighton University, *Chairman*
Lulu L. Runge, University of Nebraska, *Secretary-Treasurer*

Northern California

E. B. Roessler, University of California, Davis, *Chairman*
Gabor Szegö, Stanford University, *Vice Chairman*
H. M. Bacon, Stanford University, *Secretary-Treasurer*

OHIO

TIBOR RADÓ, Ohio State University, *Chairman*
RUFUS CRANE, Ohio Wesleyan University, *Secretary-Treasurer*

OKLAHOMA

O. H. HAMILTON, Oklahoma A. and M. College, *Chairman*
J. C. BRIXEY, University of Oklahoma, *Secretary-Treasurer*

PHILADELPHIA

ANNA PELL WHEELER, Bryn Mawr College, *Chairman*
P. M. WHITMAN, University of Pennsylvania, *Secretary-Treasurer*

ROCKY MOUNTAIN

A. E. MALLORY, Colorado State College of Education, *Chairman*
A. J. KEMPNER, University of Colorado, *Vice Chairman*
A. J. LEWIS, University of Denver, *Secretary-Treasurer*

SOUTHEASTERN

J. W. LASLEY, JR., University of North Carolina, *Chairman*
RUTH W. STOKES, Winthrop College, *Vice Chairman*
H. A. ROBINSON, Agnes Scott College, *Secretary-Treasurer*

SOUTHERN CALIFORNIA

D. C. DUNCAN, Los Angeles City College, *Chairman*
P. G. HOEL, University of California at Los Angeles, *Vice Chairman*
P. H. DAUS, University of California at Los Angeles, *Secretary-Treasurer*

SOUTHWESTERN

E. A. HAZLEWOOD, Texas Technological College, *Chairman*
P. M. SWINGLE, New Mexico State College, *Vice Chairman*
H. D. LARSEN, University of New Mexico, *Secretary-Treasurer*

TEXAS

E. H. HANSON, North Texas State Teachers College, *Chairman*
R. S. UNDERWOOD, Texas Technological College, *Vice Chairman*
NAT EDMONSON, JR., A. and M. College of Texas, *Secretary-Treasurer*

UPPER NEW YORK STATE

D. S. MORSE, Union College, *Vice Chairman*
C. W. MUNSHOWER, Colgate University, *Secretary-Treasurer*

WISCONSIN

MAY M. BEENKEN, Oshkosh State Teachers College, *Chairman*
P. L. TRUMP, University of Wisconsin, *Secretary-Treasurer*

INDIVIDUAL MEMBERS OF THE MATHEMATICAL ASSOCIATION OF AMERICA

Note. This list gives data for the members of the Association as taken from the Register issued in October 1941, unless changes in position, mailing address, etc., have been reported to the Secretary. An effort has been made to get information about those members who are in the armed services or who are serving the government in any other way which necessitates their temporary absence from the institution with which they have been connected. It would be impossible to make this list a record of all the war activities of our members, and no mention has been made of such activities when the member remains in active service in the institution in which he holds a regular appointment. When members are known to be occupied in other lines than mathematics, this fact is indicated.

ABLOW, C. M., A.M. (U.C.L.A.) Lt. (j.g.), U.S.N.R.

ACKLEY, Prof. H. M., A.M. (Olivet) Western Michigan Coll., Kalamazoo, Mich. *602 Axtell St.*

ADAMS, B. T., A.M. (Baylor) Asst. Instr., Army Air Force Tech. School, Wichita Falls, Texas. *2172 Avenue I*

ADAMS, Prof. C. R., Ph.D (Harvard) Brown Univ., Providence, R.I. *60 Intervale Road*

ADAMS, Prof. E. P., Ph.D. (Harvard) Physics, Princeton Univ., Princeton, N.J.

ADAMS, G. J., Jr. Draftsman, Alabama State Highway Dept. Address unknown

ADAMS, Asst. Prof. LOUISE, A.M. (North Carolina) High Point Coll., High Point, N.C.

ADAMS, L. J., A.M. (Southern California) Head of Dept., Jr. Coll., Santa Monica, Calif. *227 25th St.*

ADAMS, O. S., D.Sc. (Kenyon) Principal Mathematician, U. S. Coast and Geodetic Survey, Washington 25, D.C. *727 Massachusetts Ave. N.E., Washington 2, D.C.*

ADKINS, J. B., Ed.M. (Harvard) Teacher, Phillips Exeter Acad., Exeter, N.H. *Lt., U.S.N.R. 460 Riverside Drive, New York 27, N.Y.*

ADKINS, Prof. L. K., M.S. (Chicago) Head of Dept., State Teachers Coll., La Crosse, Wis.

ADKISSON, Prof. V. W., Ph.D. (Pennsylvania) Univ. of Arkansas, Fayetteville, Ark. *236 Buchanan St.*

ADLER, Asst. Prof. CLAIRE F., Ph.D. (New York Univ.) New York Univ., New York, N.Y. *189-21 Tioga Drive, St. Albans, N.Y.*

AGARD, Prof. H. L., Ph.D. (Yale) Williams Coll., Williamstown, Mass. *Box 49*

AGNEW, Prof. R. P., Ph.D. (Cornell) Cornell Univ., Ithaca, N.Y. *112 White Hall*

AHLFORS, Prof. L. V., Ph.D. (Helsingfors) Univ. of Helsingfors, Helsingfors, Finland. *Munksnäs, Finland*

AITCHISON, BEATRICE, Ph.D. (Johns Hopkins) Statistical analyst, Interstate Commerce Commission, Washington, D.C. *1929 S Street N.W., Washington 9, D.C.*

ALBERT, Prof. A. A., Ph.D. (Chicago) Univ. of Chicago, Chicago 37, Ill. *Dept. of Math.*

ALBERT, Asst. Prof. G. E., Ph.D. (Wisconsin) Ohio State Univ., Columbus 10, Ohio. *University Hall*

ALBERT, Prof. O. W., Ph.D. (Washington) Univ. of Redlands, Redlands, Calif. *629 Buena Vista St.*

ALBERTI, FURIO. B.S. (Chicago) Instr., Illinois Inst. of Tech., Chicago, Ill. *1806 S. Sixth Ave., Maywood, Ill.*

ALEXANDER, Asso. Prof. C. K., Ph.D. (Calif. Inst. of Tech.) Head of Dept., Occidental Coll., Los Angeles 41, Calif. *Dept. of Math.*

ALEXANDER, Prof. J. W., Ph.D. (Princeton) Inst. for Advanced Study, Princeton, N.J. *29 Cleveland Lane*

ALFIERI, F. A. *Private, Coast Artillery.*

ALFRED DE MARIE, Sister, A.B. (Our Lady of the Elms) Teacher, Annhurst Coll., Putnam, Conn. *Route 2*

ALLEN, Prof. E. B., Ph.D. (Rensselaer) Head of Dept., Math. and Astr., Rensselaer Poly. Inst., Troy. N.Y. *4 Sheldon Ave.*

ALLEN, EDWARD F., A.M. (Pennsylvania) Instr., Math. and Physics, Acad. of the New Church, Bryn Athyn, Pa. *Asso. Physicist, Franklin Inst., 20th and Parkway, Philadelphia, Pa.*

ALLEN, Prof. ELBERT F., Ph.D. (Missouri) Oklahoma A. and M. Coll., Stillwater, Okla. *1409 College Ave.*

ALLEN, FLORENCE E., Ph.D. (Wisconsin) Instr., Univ. of Wisconsin, Madison, Wis. *219 Lathrop St.*

ALLEN, Asso. Prof. HARRIET W., Ph.D. (Mass. Inst. of Tech.) Hollins Coll., Hollins, Va.

ALLEN, Asso. Prof. JOSEPH, A.M. (Harvard) Retired, Coll. of the City of New York, New York, N.Y. *9 Myrtle St., White Plains, N.Y.*

ALLENDOERFER, Asso. Prof. C. B., Ph.D. (Princeton) Haverford Coll., Haverford, Pa. *Consultant, Weather Training Branch, Army Air Forces, Washington, D.C. 750 Rugby Road, Bryn Mawr, Pa.*

ALLIOT, Prof. EUGENE, Lic.ès Sc. (Paris) St. Mary's Seminary, Randolph, Vt. *41 S. Main St.*

ALMAN, J. E., A.M. (Claremont) *In Service.*

AMES, Prof. L. D., Ph.D. (Harvard) Univ. of Southern California, Los Angeles 7, Calif.

AMUNDSON, N. R., M.S. (Minnesota) Instr., Math. and Mech., Univ. of Minnesota, Minneapolis, Minn. *208 Main Engg. Bldg.*

ANDERSEN, MAE R., Ph.D. (Chicago) Head of Dept., Concordia Coll., Moorhead, Minn. *507 Tenth St. S.*

ANDERSON, A. H., M.E. (Marquette) Head of Science Dept., Whitefish Bay Schools, Whitefish Bay, Wis. *937 E. Lancaster Ave., Milwaukee, Wis.*

ANDERSON, Asst. Prof. E. W., Ph.D. (Iowa State) Iowa State Coll., Ames, Iowa. *Dept. of Math.*

ANDERSON, P. H., Ph.D. (Illinois) Statistician, War Production Board, Cleveland Ohio; Lecturer, Western Reserve Univ. *8414 Brookline Ave.*

ANDERSON, R. D., A.B. (Minnesota) Instr., Univ. of Texas, Austin, Tex. *Lt. (j.g.), U.S.N.R. 51 Barton Ave. S.E., Minneapolis, Minn.*

ANDERSON, Asst. Prof. R. LUCILE, Ph.D. (Bryn Mawr) Hunter Coll., 695 Park Ave., New York 21, N.Y.

ANDERSON, Prof. W. E., Ph.D. (Pennsylvania) Miami Univ., Oxford, Ohio. *112 E. Walnut St.*

ANDERTON, ETHEL L., Ph.D. (Yale) Teacher, High School, West Haven, Conn. *215 Park Terrace Ave.*

ANN ELIZABETH, Sister, Ph.D. (Wisconsin) Prof., Registrar, St. Mary Coll., Xavier, Kans.

ANNEAR, Asst. Prof. P. R., M.S. (Case) Acting Head of Dept., Math. and Astr., Dir. of Burrell Observ., Baldwin-Wallace Coll., Berea, Ohio. *76 Rocky River Drive*

ARANY, Prof. DANIEL, Grad. (Univ. of Budapest) Emeritus, Math. in the royal school for Industry, Budapest, Hungary. *Korong-u 6, Budapest XIV, Hungary*

ARCHIBALD, Prof. R. C., Ph.D. (Strasbourg), Dr. (Univ. Padua), LL.D. (Mt. Allison) Emeritus, Brown Univ., Providence, R.I.

ARCHIBALD, Asso. Prof. R. G., Ph.D. (Chicago) Queens Coll., Flushing, N.Y.

ARENA, J. F., A.M. (Michigan) Teacher, High School, Marion, Ill.

ARMSTRONG, BEULAH M., Ph.D. (Illinois) Asso., Univ. of Illinois, Urbana, Ill. *364 Math. Bldg.*

ARNDT, Prof. W. F. C., Ph.D. (Göttingen) Univ. Coll. of the Orange Free State, Bloemfontein, Union of South Africa

ARNOLD, H. A., Ph.D. (Calif. Inst. of Tech.) *Lt., U.S.N.R. 2480 Lake Ave., Lincoln, Nebr.*

ARNOLD, H. C., A.M. (Ohio State), M.S. (Carnegie Inst. of Tech.) Tech. Director, Federal Enamel and Stamping Co., McKees Rocks, Pa. *76 Standish Blvd., Pittsburgh 16, Pa.*

ARNOLD, Asso. Prof. H. E., Ph.D. (Yale) Wesleyan Univ., Middletown, Conn.

ARNOLD, Asso. Prof. W. C., M.S., A.M. (Chicago) DePauw Univ., Greencastle, Ind. *Box 466*

ARNOLDY, Sister MARY N., Ph.D. (Catholic Univ.) Head of Dept., Marymount Coll., Salina, Kans.

AROIAN, L. A., Ph.D. (Michigan) Instr., Hunter Coll., 695 Park Ave., New York 21, N.Y.

ARTIN, Prof. EMIL, Ph.D. (Leipzig) Indiana Univ., Bloomington, Ind. *715 S. Fess Ave.*

ASHBAUGH, LAURA M. (Mrs. F. R.), A.M. (Pennsylvania) Instr., Moravian Coll. for Women, Bethlehem, Pa. *115 Wall St.*

ASHCRAFT, Prof. T. B., Ph.D. (Johns Hopkins) Colby Coll., Waterville, Me. *34 Pleasant St.*

ASTRACHAN, Asso. Prof. MAX, Ph.D. (Brown) Chm. of Dept., Antioch Coll., Yellow Springs, Ohio

ATKIN, Asso. Prof. EDITH I., A.M. (Columbia) Illinois State Normal Univ., Normal, Ill. *815 S. Fell Ave.*

ATKINS, H. P., M.S. (Brown) Instr., Univ. of Rochester, River Campus, Rochester 4, N.Y.

ATKINSON, ROBERT, A.M. (Haverford) Chm., Math. and Sci. Depts., The Shipley School, Bryn Mawr, Pa.

AUCOIN, A. A., Ph.D. (Louisiana State) *Ensign, U.S.N.R., U.S. Naval Acad., Annapolis, Md.*

AUDE, Prof. H. T. R., M.S. (Colgate) Colgate Univ., Hamilton, N.Y. *50 Broad St.*

AVERS, H. G., A.B. (George Washington) Chief Mathematician, Div. of Geodesy, U.S. Coast and Geodetic Survey, Washington 25, D.C.

AYLOR, M. W., M.S. (Virginia) Instr., Math. and Physics, Univ. of Virginia, Charlottesville, Va. *Madison, Va.*

AYRE, Asso. Prof. H. G., Ph.D. (Peabody) Western Illinois State Teachers Coll., Macomb, Ill.

AYRES, Asso. Prof. FRANK, Jr., Ph.D. (Chicago) Dickinson Coll., Carlisle, Pa. *426 S. Pitt St.*

AYRES, H. C., Ph.D. (California) Instr., U.S. Naval Acad., Annapolis, Md.

AYRES, W. L., Ph.D. (Pennsylvania) Head of Dept., Purdue Univ., Lafayette, Ind.

BABBITT, A. E., A.M. (Illinois) Vice President and Actuary, Lamar Life Ins. Co., Jackson, Miss.

BABCOCK, Dean R. W., Ph.D. (Wisconsin) School of Arts and Sci., Kansas State Coll., Manhattan, Kans.

BABCOCK, Asso. Prof. WEALTHY, Ph.D. (Kansas) Univ. of Kansas, Lawrence, Kans. *701 West 23 St.*

BACON, Prof. CLARA L., Ph.D. (Johns Hopkins) Emeritus, Goucher Coll., Baltimore, Md. *2316 N. Calvert St.*

BACON, Asso. Prof. H. M., Ph.D. (Stanford) Stanford Univ., Stanford University, Calif. *Box 1144*

BAEZ, Asst. Prof. A. V., A.M. (Syracuse) Physics and Math., Wagner Coll., Staten Island, N.Y.

BAGBY, L. C., A.M. (Kansas) Educ'l Consultant, Jam Handy Co., Detroit, Mich. *7027 E. Warren Ave., Detroit 7, Mich.*

BAIDAFF, Prof. B. I., Dr. (Buenos Aires) Analisis, Univ. Nac., Buenos Aires, Argentina. *Ave. de Mayo 560*

BAILEY, Asst. Prof. A. H., Ph.D. (Ohio State) Georgia School of Tech., Atlanta, Ga. *Box 2041*

BAILEY, C. W. Reporter, Cleveland Press, Cleveland, Ohio. *16413 Hilliard Road, Lakewood, Ohio*

BAILEY, Asso. Prof. H. W., Ph.D. (Illinois) Dir. Personnel Bureau, Univ. of Illinois, Urbana, Ill. *Educational Adviser, ASTP, STAR. 311 Administration East*

BAIRD, ARTHUR C., A.B. (Wooster) Vice Prin., Retired, Allderdice High School, Pittsburgh, Pa. *502 Lawn Ave., Hamilton, Ohio*

BAKER, Asso. Prof. FRANCES E., Ph.D. (Chicago) Vassar Coll., Poughkeepsie, N.Y.

BAKER, Asst. Prof. G. A., Ph.D. (Illinois) Coll. of Agric., Univ. of California; Asst. Statistician, Experiment Sta., Davis, Calif. *606 C Street*

BAKER, Mrs. KATHRYN C., M.S. (Chicago) R.F.D. 4, Lynchburg, Va.

BAKER, Mrs. L. H., JR., A.B. (Texas Christian) Jr. Chem. Engr., Humble Oil and Refining Co., Houston 2, Tex. *5745 Dwinnel St., Houston 3, Tex.*

BAKER, S. R., A.B. (Ursinus) Teacher, Hannah Penn Jr. High School, York, Pa. *Private, U. S. Army*

BAKST, AARON, Ph.D. (Columbia) *1st Lt., A.U.S., Air Corps. 135-12 77th Ave., Flushing, N.Y.*

BALDWIN, Asso. Prof. J. W., A.M. (Michigan) Wayne Univ., Detroit, Mich. *16191 Roselawn Ave.*

BALL, Asst. Prof. N. H., Ph.D. (Mass. Inst. of Tech.) U.S. Naval Acad., Annapolis, Md. *Capt., Coast Artillery. R.F.D. 3, Box 100a, Wilmington, N. C.*

BALLANTINE, Prof. J. P., Ph.D. (Chicago) Univ. of Washington, Seattle, Wash. *1802 Ravenna Blvd.*

BALLARD, RUTH MASON (Mrs. F. K.), Ph.D. (Chicago) Instr., Wright Jr. Coll., Chicago, Ill.; Illinois Inst. of Tech. war training program. *636 Wellington Ave.*

BALLOU, Asst. Prof. D. H., Ph.D. (Harvard) Middlebury Coll., Middlebury, Vt. *18 S. Pleasant St.*

BALOF, C. A., M.S. (Iowa) Business Mgr., Lincoln Coll., Lincoln, Ill. *623 N. Union St.*

BAMFORTH, Asso. Prof. F. R., Ph.D. (Chicago) Ohio State Univ., Columbus, Ohio. *Dept. of Math.*

BANCROFT, T. A., A.M. (Michigan) Asst., Iowa State Coll., Ames, Iowa. *Dept. of Math.*

BANERJI, S. K., D.Sc. (Calcutta) Offg. Director-General of Observ., India; Hon. Prof., Appl. Physics, Royal Inst. of Sci., Bombay, India. *Meteorological Office, Poona 5, India*

BANKS, Asso. Prof. W. G., A.M. (Virginia) Centenary Coll., Shreveport, La.

BARBOUR, Asst. Prof. J. M., Ph.D. (Cornell), Mus.D. (Toronto) Music, Michigan State Coll., East Lansing, Mich. *Music Dept.*

BARDELL, R. H., Ph.D. (Chicago) Asst. to Director, Univ. of Wisconsin Exten. Div., 623 W. State St., Milwaukee 3, Wis.

BAREIS, Asst. Prof. GRACE M., Ph.D. (Ohio State) Ohio State Univ., Columbus, Ohio. *164-13th Ave., Columbus 1, Ohio*

BARKER, Asst. Prof. C. B., Ph.D. (California) Univ. of New Mexico, Albuquerque, N.M.

BARNARD, Asso. Prof. R. W., Ph.D. (Chicago) Univ. of Chicago, Chicago, Ill. *Box 35, Eckhart Hall*

BARNES, Prof. G. F., Ph.D. (Indiana) Math. and Physics, Mississippi Coll., Clinton, Miss. *Box 182*

BARNES, J. C., B.S. (North Georgia Coll.) Head of Dept., North Georgia Coll., Dahlonega, Ga.

BARNETT, Asso. Prof. I. A., Ph.D. (Chicago) Univ. of Cincinnati, Cincinnati, Ohio. *Dept. of Math.*

BARNETT, Asst. Prof. JOSEPH, Jr., A.M. (Columbia) Oklahoma A. and M. Coll., Stillwater, Okla. *520 Maple Ave., Apt. 5*

BARR, Asso. Prof. C. F., M.S. (Chicago) Univ. of Wyoming, Laramie, Wyo. *563 N. 8th St.*
BARRAL-SOUTO, Prof. José, Sc.D. Statistics, Faculty of Econ. Sciences, Univ. of Buenos Aires, Buenos Aires, Argentina. *Córdoba 1459*
BARROW, Prof. D. F., Ph.D. (Harvard) Univ. of Georgia, Athens, Ga. *260 Cherokee Ave.*
BARTEN, H. J. Inspector, Ordnance Dept., Washington, D.C. *1518 Moreland Ave., Baltimore, Md.*
BARTKY, Prof. WALTER, Ph.D. (Chicago) Asso. Dean, Physical Sci., Univ. of Chicago, Chicago, Ill.
BARTON, Prof. HELEN, Ph.D. (Johns Hopkins) Woman's Coll., Univ. of North Carolina, Greensboro, N.C. *1027 Spring Garden St.*
BARTOO, Prof. G. C., A.M. (Michigan) Western Michigan Coll., Kalamazoo, Mich.
BARTRAM, P. R., A.B. (Hamilton) Clerk, Bethlehem Steel Co., Buffalo, N.Y. *385 Oakwood Ave., East Aurora, N.Y.*
BASOCO, Prof. M. A., Ph.D. (Calif. Inst. of Tech.) Univ. of Nebraska, Lincoln, Nebr.
BASS, T. J., Jr., A.M. (California) Instr., San Francisco Jr. Coll., San Francisco, Calif. *80 Alviso St.*
BASYE, R. E., Ph.D. (Texas) A. and M. Coll. of Texas, College Station, Tex. *Lt., U.S.N.R., 5529 Brooklyn Ave., Kansas City, Mo.*
BATCHELDER, Asso. Prof. P. M., Ph.D. (Harvard) Univ. of Texas, Austin, Tex. *910 West 22nd St., Austin 21, Tex.*
BATEMAN, Prof. HARRY, Ph.D. (Johns Hopkins) Math., Theoretical Physics, and Aeronautics, California Inst. of Tech., Pasadena 5, Calif. *1107 San Pasqual St.*
BATEN, Asso. Prof. W. D., Ph.D. (Michigan) Research asso. in statistics, Michigan State Coll., East Lansing, Mich.
BATES, GRACE E., M.S. (Brown) Instr., Sweet Briar Coll., Sweet Briar, Va.
BATTIG, LEON, A.M. (Wisconsin) Instr., Univ. of Wisconsin Exten. Div., Sheboygan, Wis. *2535 Elizabeth St.*
BATTIN, EDNA C., A.M. (Southern California) Head of Dept., Union High School, Colton, Calif. *1178 N. Eighth St.*
BATTIN, I. L., A.M. (Swarthmore) Instr., Drew Univ., Madison, N.J.
BAUER, L. M., A.M. (New Mexico) Teacher, Menaul School, Albuquerque, N.M.
BAUMGART, J. K., A.M. (Michigan) *Aviation Cadet in Meteorology*
BAUMGARTNER, R. A., A.M. (Illinois) Head of Dept., High School, Freeport, Ill. *Ensign, U.S.N.R. 225 W. Empire St., Freeport, Ill.*
BAUSER, A. V., A.M. (New York Univ) Head of Dept., Cooper High School, Shenandoah, Pa. *105 N. Ferguson St.*
BAUSERMAN, THOMAS, B.S. (West Va. Inst. of Tech.) *Lt., C.A.C.*
BAY, J. C. Librarian, The John Crerar Library, 86 East Randolph St., Chicago, Ill.
BAYS, Dr. SEVERIN. Prof. ord. math. pures, Univ. de Fribourg, Fribourg, Switzerland
BEACH, J. W., M.S. (Iowa State) Instr., Iowa State Coll., Ames, Iowa. *255 Campus Ave.*
BEAL, Asst. Prof. JUNA LUTZ, A.M. (Chicago) Acting Head of Dept., Butler Univ., Indianapolis 7, Ind. *3262 Broadway, Indianapolis 5, Ind.*
BEARD, HELEN P., A.M. (Pennsylvania) Instr., Newcomb Coll., New Orleans 18, La.
BEATLEY, Asso. Prof. RALPH, A.M. (Columbia) Harvard Grad. School of Educ., Cambridge 38, Mass.
BEATTY, Asst. Prof. H. M., A.M. (Ohio State) Ohio State Univ., Columbus, Ohio. *200 Tibet Road*
BEATTY, Prof. SAMUEL, Ph.D. (Toronto) Dean, Faculty of Arts, Univ. of Toronto, Toronto, Ont., Canada
BEATY, Prof. E. B., A.M. (California) Oregon State Coll., Corvallis, Ore.
BEAVER, Asst. Prof. R. A., Ph.D. (Cornell) New York State Coll. for Teachers, Albany 3, N.Y.
BECKENBACH, Asso. Prof. E. F., Ph.D. (Rice) Univ. of Texas, Austin 12, Tex.
BECKER, H. W. Instr., Training Div., Mare Island Navy Yard, Vallejo, Calif. *126 Benson Ave.*
BECKWITH, Prof. ETHELWYNN R. (Mrs. W. E.), Ph.D. (Radcliffe) Head of Dept., Milwaukee-Downer Coll., Milwaukee, Wis.
BECKWITH, MABLE L., A.M. (Claremont) Supervising Prin., Brawley School Dist., Brawley, Calif. *Ensign, WAVE. Inspector, Navy Material, Denver, Colo. 716 Security Life Bldg.*
BECKWITH, Asso. Prof. W. S., A.M. (Harvard) Univ. of Georgia, Athens, Ga. *731 Cobb St.*
BEEGLE, Prof. B. L., M.S. (Washington) Dean, Seattle Pacific Coll., 3307 Third Ave. W., Seattle, Wash.
BEELER, Asso. Prof. F. A., A.M. (Indiana) Hillsdale Coll., Hillsdale, Mich. *Lt., U.S.N.R., 400 West 119 St., New York 27, N.Y.*
BEENKEN, Prof. MAY M., Ph.D. (Chicago) Head of Dept., State Teachers Coll., Oshkosh, Wis.

BEER, Asst. Prof. F. P., Ph.D. (Geneva) Physics, Williams Coll., Williamstown, Mass. *Thompson Phys. Lab.*
BEESLEY, Asst. Prof. E. M., Ph.D. (Brown) Univ. of Nevada, Reno, Nevada. *Dept. of Math.*
BEGLE, E. G., Ph.D. (Princeton) Instr., Yale Univ., New Haven, Conn. *11 Hubinger St.*
BEINERT, R. L., A.B. (Hobart) Teaching asst., Cornell Univ., Ithaca, N.Y. *White Hall*
BEITO, E. A., A.M. (Minnesota) *In Service*
BELDING, R. F., A.B. (Amherst) Instr., Vermont Acad., Saxtons River, Vt.
BELL, Asso. Prof. CLIFFORD, Ph.D. (California) Univ. of California at Los Angeles, Los Angeles 24, Calif. *10514 Rochester Ave.*
BELL, Prof. E. T., Ph.D. (Columbia) California Inst. of Tech., Pasadena 4, Calif.
BELL, LOIS E., A.M. (Kansas) Teacher, Math. and Physics, High School, San Diego, Calif. *4218 Stephens St., San Diego 3, Calif.*
BELL, R. F., M.S. (Michigan) Instr., Eastern Washington Coll. of Educ., Cheney, Wash. *Prof., Physics, State Teachers Coll., Valley City, N.D.*
BELL, Prof. TALMON, A.B. (Sterling) Sterling Coll., Sterling, Kans.
BELLAMY, B. C., B.S.C.E. (Wyoming) Civil Engineer, Laramie, Wyo. *Box 37, Lamont, Wyo.*
BELLARDO, J. E., M.S. (St. Bonaventure) Instr., Aquinas Coll., 69 Ransom Ave., Grand Rapids, Mich.
BEMMELS, Prof. W. D., Ph.D. (Colorado) Math. and Physics, Ottawa Univ., Ottawa, Kans.
BENDER, Asso. Prof. H. A., Ph.D. (Illinois) Univ. of Akron, Akron, Ohio. *325 Grace Ave.*
BENEDICTA, Sister M. (Boyle), M.S. (St. Bonaventure) Prof., Villa Maria Coll., Erie, Pa. *West Eighth St.*
BENNER, Asso. Prof. J. A., A.M. (Lafayette) Lafayette Coll., Easton, Pa. *522 Parsons St.*
BENNETT, Prof. A. A., Ph.D. (Princeton) Brown Univ., Providence, R.I. *Major, A.U.S., Ordnance Dept., Ballistic Research Lab., Aberdeen Proving Ground, Md.*
BENNETT, Prof. THEODORE, Ph.D. (Illinois) Marietta Coll., Marietta, Ohio
BENSCOTER, S. U., M.S., C.E. (Illinois) Asso. Engr., Bureau of Aeronautics, Navy Dept., Washington, D.C. *A-12 Madison Bldg., Presidential Gardens, Alexandria, Va.*
BERGER, EDLA G., A.M. (Minnesota) Equitable Life Assur. Soc., New York, N.Y. *1411 161st St., Beechhurst, N.Y.*
BERGSTRESSER, C. A., A.M. (Lafayette), M.S. (Pennsylvania) Head of Dept., Jamaica High School, New York, N.Y. *112-66 175th Pl., St. Albans, N. Y.*
BERKELEY, L. M., A.M. (Virginia) 415 West 118 St., New York, N.Y.
BERNARD ALFRED, Brother (Welch), A.M. (Catholic Univ.) Asso. Prof., Manhattan Coll., Spuyten Duyvil Parkway, New York 63, N.Y.
BERNSTEIN, Prof. B. A., Ph.D. (California) Univ. of California, Berkeley, Calif. *2785 Shasta Road*
BERNSTEIN, DOROTHY L., Ph.D. (Brown) Instr., Univ. of Rochester, Rochester, N.Y.
BERNSTEIN, Prof. FELIX, Ph.D. (Göttingen) Biometrics, New York Univ., New York, N.Y.
BERRY, Prof. A. C., Ph.D. (Harvard) Lawrence Coll., Appleton, Wis.
BERRY, E. M., Ph.D. (Iowa) Head of Dept., State Teachers Coll., Chadron, Nebr. *353 Chapin St.*
BERRY, T. E., B.S. (George Washington) Analyst, Social Security Board, Washington, D.C. *200 Rhode Island Ave.N.E.*
BERRY, Prof. W. J., A.M. (Harvard) Retired, Poly. Inst. of Brooklyn, Brooklyn, N.Y. *224 St. John's Place, Brooklyn 17, N.Y.*
BERT, Prof. O. F. H., A.M. (Geneva) Washington and Jefferson Coll., Washington, Pa. *28 N. Lincoln St.*
BERTRAND, Sister M. (Walton), Ph.D. (Fordham) Teacher, Marywood Coll., Scranton, Pa.
BETTINGER, Asst. Prof. A. K., A.M. (Wisconsin) Creighton Univ., Omaha, Nebr.
BETZ, WILLIAM, A.M. (Rochester) Specialist in math., Rochester public schools; Univ. of Rochester, Rochester, N.Y. *652 Melville St.*
BEVERIDGE, Prof. H. R., Ph.D. (Illinois) Monmouth Coll., Monmouth, Ill. *1043 E. Detroit Ave.*
BIBB, Asso. Prof. S. F., M.S. (Chicago) Illinois Inst. of Tech., 3300 Federal St., Chicago, Ill.
BICKERSTAFF, Asst. Prof. T. A., A.M. (Mississippi) Registrar, Univ. of Mississippi, University, Miss. *Box 7*
BIESELE, F. C., Ph.D. (Texas) Instr., Univ. of Utah, Salt Lake City, Utah. *Dept. of Math.*
BIGELOW, W. W., A.B. (Beloit), B.S.C.E. (George Washington) Analyst, A. O. Smith Corp., Milwaukee, Wis. *Rockton, Ill.*
BIGGERSTAFF, J. S., M.S. (Washington) Instr., Rensselaer Poly. Inst., Troy, N.Y. *8 Eaton Road*
BILLIG, A. L., Ed.D. (Temple) Teacher, Science, High School, Allentown, Pa. *1328 Gordon St.*
BINGLEY, G. A., A.M. (Princeton) Tutor, St. John's Coll., Annapolis, Md.
BIRCHBY, Asst. Prof. W. N., A.M. (Colorado Coll.) California Inst. of Tech., Pasadena, Calif.

BIRCHENOUGH, Prof. HARRY, A.M. (Columbia) New York State Coll. for Teachers, Albany 3, N.Y.

BIRD, Asso. Prof. M. T., Ph.D. (Illinois) Utah State Agric. Coll., Logan, Utah

BIRKHOFF, Asso. Prof. GARRETT, A. B. (Harvard) Harvard Univ., Cambridge, Mass. *45 Fayerweather St.*

BIRKHOFF, Prof. G. D., Ph.D. (Chicago) Harvard Univ., Cambridge, Mass. *987 Memorial Drive*

BISSINGER, B. H., Ph.D. (Cornell) Instr., Michigan State Coll., East Lansing, Mich. *Dept. of Math.*

BLACK, Prof. A. H., Ph.D. (Cornell) Lebanon Valley Coll., Annville, Pa. *625 E. Main St.*

BLACK, Asso. Prof. FLORENCE L., Ph.D. (Kansas) Univ. of Kansas, Lawrence, Kans. *1300 Louisiana St.*

BLACK, Prof. H. L., Ph.D. (Illinois) Westminster Coll., New Wilmington, Pa. *239 New Castle St.*

BLACK, L. G., A.M. (Colorado) Instr., Purdue Univ., West Lafayette, Ind. *220 S. Salisbury St.*

BLACK, L. T., A.M. (Michigan) Long Beach Jr. Coll., Long Beach, Calif. *Instr., Univ. of California at Los Angeles, Los Angeles, Calif. 1230 Hungerford St., Long Beach 5, Calif.*

BLACKALL, C. J., Ph.D. (Cornell) *2nd Lt., C.A.C. North Baltimore, Ohio*

BLACKWELL, Asso. Prof. R. C., Ph.D. (North Carolina) Furman Univ., Greenville, S.C. *322 University Ridge*

BLAIR, Prof. HAROLD, A.M. (Michigan) Western Michigan Coll., Kalamazoo, Mich. *1220 Academy St.*

BLAIR, Asso. Prof. LEORA, A.M. (Chicago) State Normal Coll., Natchitoches, La. *404 New Second St.*

BLAIR, Asso. Prof. R. V., Ph.D. (Peabody) Vanderbilt Univ., Nashville 5, Tenn.

BLAKE, ARCHIE, Ph.D. (Chicago) Engr., National Inventors Council, Washington, D.C. *2812 Cathedral Ave., N.W., Washington 8, D.C.*

BLAKE, R. G., A.B. (Florida) Instr., Univ. of Florida, Gainesville, Fla. *9 Peabody Hall*

BLAKEMAN, B. E., A.M. (Illinois) *Ensign, U.S.N.R.*

BLANCHE, E. E., Ph.D. (Illinois) Statistical Dir., Office of Engg., Curtiss-Wright Corp., Buffalo, N.Y. *Plant 2*

BLAU, L. W., Ph.D. (Texas) Research consultant, Humble Oil and Refining Co., Houston 1, Tex. *2027 Colquitt Ave.*

BLEICK, Asst. Prof. W. E., Ph.D. (Johns Hopkins) U.S. Naval Acad., Annapolis, Md. *On leave. Lt. Comdr., U.S.N.R. 8 Taney Ave.*

BLICHFELDT, Prof. H. F., Ph.D. (Leipzig) Emeritus, Stanford Univ., Stanford University, Calif. *520 W. Crescent Drive, Palo Alto, Calif.*

BLINCOE, Prof. J. W., Ph.D. (Virginia) Randolph-Macon Coll., Ashland, Va.

BLISS, Prof. G. A., Ph.D. (Chicago) Emeritus, Univ. of Chicago, Chicago, Ill. *Flossmoor, Ill.*

BLOOM, G. M., A.M. (Northwestern) Teacher, Math. and Science, Ballard Memorial School, Louisville, Ky. *Lt., U.S.N.R., Head, Navigation Dept., Midshipmen's School, Notre Dame, Ind.*

BLUMBERG, A. A., A.B. (Texas) Instr., A. and M. Coll. of Texas, College Station, Tex. *Box 149 Faculty Exchange*

BLUMBERG, Prof. HENRY, Ph.D. (Göttingen) Ohio State Univ., Columbus, Ohio. *76 E. Blake Ave.*

BLUMBERG, Asst. Prof. J. O., Ph.D. (Pittsburgh) Univ. of Pittsburgh, Pittsburgh, Pa. *308 Foster St., Greensburg, Pa.*

BLUMENTHAL, Asso. Prof. L. M., Ph.D. (Johns Hopkins) Univ. of Missouri, Columbia, Mo. *Dept. of Math.*

BLYTH, C. R. Student, Queen's Univ., Kingston, Ont., Can. *R. R. 5, Guelph, Ont., Can.*

BOARDMAN, H. C., C.E. (Illinois), D.E. (S.D.St. Sch. of Mines) Research Engr., Chicago Bridge and Iron Co., Chicago, Ill. *10357 S. Hoyne Ave.*

BOAS, R. P., Jr., Ph.D. (Harvard) Visiting Lecturer, Harvard Univ., Cambridge, Mass. *21 Chauncy St., Cambridge 38, Mass.*

BOATMAN, Prof. A. O., A.M. (Indiana) Carthage Coll., Carthage, Ill.

BOCK, W. W., M.S. (Colorado) Medical student, Univ. of St. Louis, St. Louis, Mo. *3532 A Vista Ave., St. Louis 4, Mo.*

BOEDER, PAUL, Ph.D. (Göttingen) Visual Scientist, Amer. Optical Co., Southbridge, Mass.

BOEHM, FRANK. Manager, Life Insurance, New York, N.Y. *80 Maiden Lane*

BOEHMER, Sister M. MIRABELLA, M.S. (Catholic Univ.) Instr., Alverno Teachers Coll., 1413 S. Layton Blvd., Milwaukee, Wis.

BOHNENBLUST, Asso. Prof. H. F., Ph.D. (Princeton) Princeton Univ., Princeton, N.J. *Fine Hall*

BOLDYREFF, Asso. Prof. A. W., Ph.D. (Michigan) Univ. of Arizona, Tucson, Ariz. *Lt., Army Air Force. 2309 E. Fifth St., Tucson, Ariz.*

BOLKS, STANLEY, M.S. (Iowa State) Instr., Purdue Univ., West Lafayette, Ind.
BOOKSTEIN, J. M., A.M. (Michigan) *2nd Lt., Army Air Forces. 2253 Glynn Court, Detroit, Mich.*
BORGMAN, Asst. Prof. W. M., Jr., Ph.D. (Chicago) Wayne Univ., Detroit 1, Mich.
BOROFSKY, Asst. Prof. SAMUEL, Ph.D. (Columbia) Brooklyn Coll., Brooklyn, N.Y. *1st Lt., Army Air Forces. 335 State St., Brooklyn, N.Y.*
BORTOLOTTI, Prof. ETTORE, Dottore in mat. (Bologna) Univ. of Bologna, Bologna, Italy. *Via Albertazzi 43*
BOTTS, T. A., Ph.D. (Virginia) *Lt. (j.g.), U.S.N.R., 2009 Wisconsin Ave., Washington 7, D.C.*
BOURNE, S. G., B.S. (Rutgers) Instr., Johns Hopkins Univ., Baltimore, Md. *Dept. of Math.*
BOUTELLE, Asst. Prof. H. D., B.S., Ch.E. (Worcester Poly. Inst.) Massachusetts State Coll., Amherst, Mass. *69 S. Pleasant St.*
BOWDEN, Prof. JOSEPH, Ph.D. (Yale) Emeritus, Adelphi Coll., Garden City, N.Y. *21 Carleton Pl., Baldwin, N.Y.*
BOWDEN, MURIEL, A.M. (Columbia) Lecturer, Hunter Coll., New York, N.Y. *405 Park Ave., New York 22, N.Y.*
BOWER, Asst. Prof. JULIA W., Ph.D. (Chicago) Connecticut Coll., New London, Conn. *Dept. of Math.*
BOWKER, Asso. Prof. J. G., Ed.M. (Harvard) Middlebury Coll., Middlebury, Vt. *14 Adirondack View*
BOWLING, Asso. Prof. FLOYD, M.S. (Iowa) Lincoln Mem. Univ., Harrogate, Tenn. *Lt. (j.g.), U.S.N.R., Instr., U.S. Naval Pre-Flight School, St. Mary's College, Calif.*
BOYCE, Asso. Prof. FANNIE W., Ph.D. (Chicago) Wheaton Coll., Wheaton, Ill. *311 E. Wesley St.*
BOYCE, Prof. JESSIE W., A.M. (Minnesota) Chm. of Dept., State Teachers Coll., Wayne, Nebr. *518 Lincoln St.*
BOYCE, Asso. Prof. M. G., Ph.D. (Chicago) Western Reserve Univ., Cleveland, Ohio
BOYD, Dean P. P., Ph.D. (Cornell), LL.D. (Park Coll.) Head of Dept., Math. and Astr., Univ. of Kentucky, Lexington, Ky.
BOYER, Asst. Prof. C. B., Ph.D. (Columbia) Brooklyn Coll., Bedford Ave. and Avenue H, Brooklyn, N.Y.
BOYER, L. E., Ed.D (Pennsylvania State Coll.) State Teachers Coll., Millersville, Pa. *406 N. George St.*
BRADFORD, Asst. Prof. W. H., M.S. (Louisiana) McNeese Jr. Coll. of L.S.U., Lake Charles, La.
BRADLEY, Asst. Prof. A. D., Ph.D. (Columbia) Hunter Coll., New York, N.Y. *Lt. (j.g.), U.S.N.R., Ground School, Naval Air Sta., Dallas, Tex. 66 Villard Ave., Hastings-on-Hudson, N.Y.*
BRADSHAW, Prof. J. W., Ph.D. (Strassburg) Univ. of Michigan, Ann Arbor, Mich. *1304 Cambridge Road*
BRADY, W. G., B.S. (Washington and Jefferson) Instr., Washington and Jefferson Coll., Washington, Pa. *1156 E. 56th St., Chicago, Ill.*
BRAMBLE, Prof. C. C., Ph.D. (Johns Hopkins) Math. and Mech., Postgraduate School, U.S. Naval Acad., Annapolis, Md. *Comdr., U.S.N.R., 145 Monticello Ave., Annapolis, Md.*
BRAND, Prof. LOUIS, Ph.D. (Harvard) Chm. of Dept., Univ. of Cincinnati, Cincinnati, Ohio; *Supervisor, war research at Wright Field, Dayton, Ohio*
BRANDEBERRY, Prof. J. B., Ph.D. (Michigan) Math. and Engg. Mech., Univ. of Toledo, Toledo, Ohio
BRANDNER, F. A., A.M., M.S. (Chicago) Instr., Iowa State Coll., Ames, Iowa. *Dept. of Math.*
BRANDT, Asst. Prof. ANGELINE J., Ph.D. (Michigan) Wheaton Coll., Wheaton, Ill.
BRANSON, Asst. Prof. HERMAN, Ph.D. (Cincinnati) Physics, Howard Univ., Washington, D.C. *Dept. of Physics*
BRANSON, Dean J. W., M.S. (Purdue) Acting Pres., New Mexico Coll. of A. and M.A., State College, N.M.
BRATTON, Pres. W. A., Sc.D. (Williams) Emeritus, Whitman Coll., Walla Walla, Wash.
BRAUER, Asso. Prof. RICHARD, Ph.D. (Berlin) Univ. of Toronto, Toronto 5, Ont., Can. *Dept. of Math.*
BRAVERMAN, BENJAMIN, A. M. (Columbia) Chm. of Dept., Seward Park High School, New York, N.Y. *1309 Avenue L, Brooklyn, N.Y.*
BRAY, Prof. H. E., Ph.D. (Rice) Rice Inst., Houston, Tex.
BRENDEL, RUTH A., A.B. (Buffalo) Instr., Univ. of Buffalo, Buffalo, N.Y. *145 E. Morris Ave., Buffalo 14, N.Y.*
BRENKE, Prof. W. C., Ph.D. (Harvard) Univ. of Nebraska, Lincoln, Nebr. *1250 S. 21st St.*
BRIANT, R. C., B.S.Ch.E. (Lafayette) Sr. Indus. Fellow, Mellon Inst. of Indus. Research, Pittsburgh, Pa. *408 Glasgow Road, Pittsburgh 21, Pa.*

BRIDGER, C. A., M.S. (Oregon State Coll.) Jr. Metallurgist, U.S. Bureau of Mines, Salt Lake City, Utah. *340 University St.*

BRIGHT, Asst. Prof. H. F., A.B. (Lake Forest) Denison Univ., Granville, Ohio. *222 Pearl St.*

BRINK, Prof. R. W., Ph.D. (Harvard) Chm. of Dept., Univ. of Minnesota, Minneapolis, Minn. *2243 Hoyt Ave., St. Paul, Minn.*

BRINKMANN, Asso. Prof. H. W., Ph.D. (Harvard) Swarthmore Coll., Swarthmore, Pa.

BRITTON, Asst. Prof. JACK, Ph.D. (Colorado) Eng. Math., Univ. of Colorado, Boulder, Colo.

BRIXEY, Asso. Prof. J. C., Ph.D. (Chicago) Univ. of Oklahoma, Norman, Okla. *927 S. Pickard St.*

BROCK, PAUL, A.B. (Brooklyn) Princeton Univ., Princeton, N.J. *P.F.C., Army Air Force Tech. Trg. Command. 1421 East 34 St., Brooklyn, N.Y.*

BRONSTEIN, SAMUEL, A.M. (New York Univ.) Teacher, High School, Hartford, Conn. *Inspector of naval materials. 56 Adams St., Hartford 5, Conn.*

BROOKE, Prof. W. E., A.M. (Nebraska) Emeritus, Math. and Mech., Univ. of Minnesota, Minneapolis, Minn. *416 Walnut St. S.E., Minneapolis 14, Minn.*

BROOKS, Asst. Prof. FOSTER, Ph.D. (Ohio State) Kent State Univ., Kent, Ohio. *Sherrodsville, Ohio*

BROWN, Asst. Prof. A. B., Ph.D. (Harvard) Queens Coll., Flushing, N.Y.

BROWN, Prof. B. H., Ph.D. (Harvard) Dartmouth Coll., Hanover, N.H. *7 Ripley Rd.*

BROWN, B. K., A.M. (Colorado) Instr., Colorado School of Mines, Golden, Colo. *23 Mines Park*

BROWN, Asst. Prof. E. C., A.M. (Maine) Worcester Poly. Inst., Worcester, Mass. *51 Grafton St., Shrewsbury, Mass.*

BROWN, H. K., Ph.D. (Michigan) Instr., Rensselaer Poly. Inst., Troy, N.Y. *703 Grand St.*

BROWN, Prof. H. S., M.S. (Lafayette) Emeritus, Hamilton Coll., Clinton, N.Y. *College Campus*

BROWN, Prof. LILLIAN O., A.M. (Columbia) Hood Coll., Frederick, Md.

BROWN, Asst. Prof. M. C., A.M. (Kentucky) Univ. of Kentucky, Lexington, Ky. *448 Clifton Ave.*

BROWN, Asso. Prof. MYRTLE C., A.M. (Texas) North Texas State Teachers Coll., Denton, Tex. *1415 W. Oak St.*

BROWN, Asso. Prof. O.E., Ph.D. (Chicago) Case School of Appl. Sci., Cleveland, Ohio. *1842 Taylor Road, East Cleveland, Ohio*

BROWN, R. D., Jr. Engr. in charge, Patent Dept., Philco Corp., Philadelphia, Pa. *Blue Bell, Montgomery Co., Pa.*

BROWN, Asso. Prof. R. E., M.S. (Mass. Inst. of Tech.) Mech. Eng., Rhode Island State Coll., Kingston, R.I. *Box 211*

BROWN, Prof. T. H., Ph.D. (Yale) Business Statistics, Harvard Grad. School of Bus. Admin., Boston, Mass. *25 Meadow Way, Cambridge, Mass.*

BROWN, W. B., Ph.D. (Ohio State) Baldwin-Wallace Coll., Berea, Ohio. *Nat'l Advisory Comm. for Aeronautics, Cleveland, Ohio. 178 Baker St., Berea, Ohio*

BROWNE, D. H. 10 Indian Orchard Pl., Buffalo 10, N.Y.

BROWNE, Prof. E. T., Ph.D. (Chicago) Univ. of North Carolina, Chapel Hill, N.C. *730 E. Franklin St.*

BROWNE, P. L., A.M. (Michigan State Coll.) *Instr., War training program, Illinois Inst. of Tech., Chicago, Ill. 130 N. Parkside St.*

BROYDE, SAMUEL, B.S. (Chicago), J.D. (DePaul) Northwestern Univ., Evanston, Ill. *1319 Touhy Ave., Chicago, Ill.*

BRUCE, Prof. C. W., Ph.D. (Virginia) Wesleyan Coll., Macon, Ga.

BRUCE, Prof. R. E., Ph.D. (Boston Univ.) Boston Univ., Boston, Mass. *688 Boylston St.*

BRUNK, H. D., A.M. (Rice) Asst., Rice Inst., Houston, Tex. *1703 Bolsover Rd.*

BRYAN, Asso. Prof. N. R., Ph.D. (Columbia) Univ. of Maine, Orono, Me. *4 University Place*

BRYSON, A. M., A.M. (Pittsburgh) Instr., Univ. of Pittsburgh, Pittsburgh, Pa. *McCutcheon Lane, Wilkinsburg, Pa.*

BUCHANAN, Asso. Prof. ANN S., A.M. (Louisiana State) Southwestern Louisiana Inst., Lafayette, La. *1106 Lee Ave.*

BUCHANAN, Prof. DANIEL, Ph.D. (Chicago) Dean of Faculty of Arts and Sci., Univ. of British Columbia, Vancouver, B.C., Can.

BUCHANAN, Prof. H. E., Ph.D. (Chicago) Tulane Univ., New Orleans 15, La.

BUCHANAN, Dean SCOTT, Ph.D. (Harvard) St. John's Coll., Annapolis, Md.

BUCK, R. C., A.M. (Cincinnati) Jr. Fellow, Harvard Univ., Cambridge 38, Mass. *Adams House G-31*

BUELL, C. E., Ph.D. (Washington Univ.) Chief Meteorologist, American Airlines, Inc., LaGuardia Airport, Jackson Heights, New York, N.Y. *6 Town Path, Glen Cove, N.Y.*

BUELL, E. L., Ph.D. (Mass. Inst. of Tech.) Instr., Northwestern Univ., Evanston, Ill. *Dept. of Math.*

BUIKSTRA, B. H., M.S. (Kansas State Coll.) *Lt., U.S.N.R.; Instr., Midshipmen's School, New York, N.Y. 435 West 119 St.*

BUKER, W. E., A.M. (Ohio State) Teacher, Public school, Pittsburgh, Pa. *Teacher in war training program at Univ. of Pittsburgh. 3833 Oswego St., Pittsburgh, Pa.*

BULLARD, Prof. J. A., Ph.D. (Clark) Chm. of Dept., Math. and Mech., Univ. of Vermont, Burlington, Vt. *110 Summit St.*

BULLITT, W. M., B.S. (Princeton) 1711 Kentucky Home Life Bldg., Louisville, Ky.

BULLOCK, Asso. Prof. R. C., Ph.D. (Chicago) North Carolina State Coll., Raleigh, N.C. *Box 5548 State College Sta.*

BUMER, Prof. C. T., Ph.D. (Ohio State) Chm. of Dept., Kenyon Coll., Gambier, Ohio

BUNYAN, Asst. Prof. L. H., Ph.D. (Wisconsin) Rutgers Univ., New Brunswick, N.J.

BURDICK, O. Z., M.S. (Illinois) Lawyer, 713 S. Courtland St., Hart, Mich.

BURGESS, R. W., Ph.D. (Cornell) Chief Statistician, Western Elec. Co., 195 Broadway, New York, N.Y.

BURINGTON, Asso. Prof. R. S., Ph.D. (Ohio State) Case School of Appl. Sci., Cleveland, Ohio. *Research mathematician, Bureau of Ordnance, Navy Dept., Washington, D.C. 5200 N. Carlin Spring Rd., Arlington, Va.*

BURK, Asso. Prof. J. D., B.A. (Toronto) Univ. of Toronto, Toronto, Ont., Can. *30 Duggan Ave.*

BURKE, J. G., A.M. (Mt. St. Mary) Vice Pres., Mount St. Mary Coll., Emmitsburg, Md.

BURKE, Sister LEONARDA, Ph.D. (Catholic Univ.) Prof., Regis Coll., Weston, Mass.

BURKETT, Asso. Prof. F. J. H., Ph.D. (New York Univ.) Union Coll., Schenectady, N.Y. *Priorities clerk, General Electric Company. 1030 Park Ave.*

BURNAM, Prof. J. F., A.M. (Texas) Hardin-Simmons Univ., Abilene, Tex. *1141 Grape St.*

BURNS, Asst. Prof. H. E., Ph.D. (Northwestern Univ.) Indiana Univ. Exten., East Chicago, Ind.

BURNS, Sister MARY ROBERDETTE, A.M. (Illinois) Asso. Prof., Clarke Coll., Dubuque, Iowa

BURR, Asst. Prof. I. W., Ph.D. (Michigan) Purdue Univ., West Lafayette, Ind.

BURT, MARY M. (Mrs. L. N.), A.M. (Wisconsin) 800-24th Ave. N., St. Petersburg, Fla.

BURWELL, W. R., Ph.D. (Oxford) Chairman, Brush Devel. Co., 3311 Perkins Ave., Cleveland, Ohio

BUSEMANN, Asst. Prof. HERBERT, Ph.D. (Göttingen) Illinois Inst. of Tech., 3300 Federal St., Chicago 16, Ill.

BUSH, Prof. L. E., Ph.D. (Ohio State) Chm. of Dept., Coll. of St. Thomas, St. Paul, Minn.

BUSHEY, Asso. Prof. JEWELL HUGHES (Mrs. J. H.), Ph.D. (Chicago) Hunter Coll., New York, N.Y. *501 West 113 St.*

BUSHEY, Asso. Prof. J. HOBART, Ph.D. (Michigan) Hunter Coll., 695 Park Ave., New York, N.Y.

BUSSEY, Prof. W. H., Ph.D. (Chicago) Asst. Dean, Univ. of Minnesota, Minneapolis, Minn. *106 Folwell Hall*

BUTCHART, Asst. Prof. J. H., Ph.D. (Illinois) Grinnell Coll., Grinnell, Iowa. *1716 Sixth Ave.*

BUTLER, C. H., Ph.D. (Missouri) Western Michigan Coll., Kalamazoo, Mich.

BUTLER, L. G., A.M. (Oregon) Instr., State Coll. of Washington, Pullman, Wash. *1904 B Street*

BUTTER, F. A., Jr., Ph.D. (Stanford) Instr., Univ. of Wisconsin, Madison 6, Wis. *Dept. of Math., North Hall*

BUTTERFIELD, Prof. A. D., A.M. (Columbia) Math. and Geodesy, Univ. of Vermont, Burlington, Vt. *25 Colchester Ave.*

BUXTON, Asso. Prof. C. L., M.S. (Case School) Physics, Clarkson Coll. of Tech., Potsdam, N.Y. *91 Market St.*

BYRNE, Prof. W. E., Ph.D. (Rensselaer) Colonel, Virginia Military Inst., Lexington, Va. *Box 836*

CAIN, Asso. Prof. W. H., A.M. (Columbia) Western Michigan Coll., Kalamazoo, Mich. *1325 W. Lovell St.*

CAIRNS, Asst. Prof. S. S., Ph.D. (Harvard) Queens Coll., Flushing, N.Y. *42-14 149th Place*

CAIRNS, Prof. W. D., Ph.D. (Göttingen) Emeritus, Oberlin Coll., Oberlin, Ohio. *Teaching in war training program, Univ. of New Mexico, Albuquerque, N.M. 2115 E. Coal Ave., Albuquerque, N.M.*

CALCAGNO, H. E. Patria 715, Montevideo, Uruguay

CALKINS, ELEANOR, A.M. (Michigan) Instr., Coll. of William and Mary, Williamsburg, Va. *121 Chandler Ct.*

CALKINS, Prof. HELEN, Ph.D. (Cornell) Head of Dept., Pennsylvania Coll. for Women, Pittsburgh, Pa. *Lecturer, Univ. of Minnesota, Minneapolis, Minn. Sheridan Hotel, Minneapolis, Minn.*

CALLAGHAN, Sister M. PATRICIA, A.M. (St. Louis Univ.) Prof., Fontbonne Coll., Wydown and Big Bend Blvd., St. Louis, Mo.
CALLAHAN, Asso. Prof. ETHEL B., Ph.D. (Columbia) Hartwick Coll., Oneonta, N.Y. *122 Chestnut St.*
CALLAWAY, Asso. Prof. IRIS, A.M. (Peabody) Univ. of Georgia, Athens, Ga. *Coordinate Campus*
CALLAWAY, Mrs. THEODOSIA T., A.M. (Columbia) Prof., Stephens Coll., Columbia, Mo. *1515 Ross St.*
CALVERT, Asst. Prof. R. L., A.M. (Illinois) Utah State Agric. Coll., Logan, Utah. *348½ E. Second N.*
CAMERON, Asso. Prof. E. A., Ph.D. (North Carolina) Univ. of North Carolina, Chapel Hill, N.C. *Lt. (j.g.), U.S.N.R.*
CAMERON, Asso. Prof. R. H., Ph.D. (Cornell) Massachusetts Inst. of Tech., Cambridge, Mass. *17 Frost Road, Belmont, Mass.*
CAMP, Prof. B. H., Ph.D. (Yale) Wesleyan Univ., Middletown, Conn. *110 Mt. Vernon St.*
CAMP, Prof. C. C., Ph.D. (Cornell) Univ. of Nebraska, Lincoln, Nebr. *Dept. of Math.*
CAMP, Prof. E. J., Ph.D. (Chicago) Macalester Coll., St. Paul, Minn. *1753 Stanford Ave.*
CAMPAIGNE, H. H., Ph.D. (Northwestern) Instr., Univ. of Minnesota, Minneapolis, Minn. *Lt., U.S.N.R., 2502 N. Fourth St., Arlington, Va.*
CAMPBELL, D. F., Ph.D. (Harvard) Consulting Actuary, 160 N. LaSalle St., Chicago, Ill.
CAMPBELL, G. A., Ph.D. (Harvard) Retired, American Tel. and Tel. Co., New York, N.Y. *129 Bellevue Ave., Upper Montclair, N.J.*
CAMPBELL, J. D., A.M. (Illinois) Instr., Rensselaer Poly. Inst., Troy, N.Y.
CAMPBELL, JESSIE R., A.B. (Syracuse) Instr., High School, Hollywood, Calif. *12 The Strand, Hermosa Beach, Calif.*
CAMPBELL, Prof. J. W., Ph.D. (Chicago) Univ. of Alberta, Edmonton South, Alta., Can. *Dept. of Math.*
CAMPBELL, Asso. Prof. W. B., A.M. (Cornell) Engg., Pennsylvania Military Coll., Chester, Pa. *6848 N. Seventh St., Philadelphia, Pa.*
CANDY, Prof. A. L., Ph.D. (Nebraska) Emeritus, Univ. of Nebraska, Lincoln, Nebr. *1003 H Street*
CANNING, JOSEPH, A. B. (Intermountain) Roundhouse Foreman, Northern Pacific R.R., Garrison, Mont.
CAPARÓ, Prof. J. A., Ph.D. (Notre Dame) Elec. Engg., Univ. of Notre Dame, Notre Dame, Ind. *1024 Leeper Blvd., South Bend, Ind.*
CAPESIUS, Rev. JOHN, A.M. (Alabama) Dean, St. Bernard Coll., St. Bernard, Ala.
CARAÇA, Prof. B. DEJ. (Ci. Ec. e Fin.) Inst. Superior de Cien., Econ. e Finan., Univ. Tecnica de Lisboa, Lisbon, Portugal
CAREY, Asso. Prof. E. F. A., M.S. (California) Emeritus, Univ. of Montana, Missoula, Mont.
CARIS, Asso. Prof. P. A., Ph.D. (Pennsylvania) Univ. of Pennsylvania, Philadelphia, Pa. *717 Shadeland Ave., Drexel Hill, Pa.*
CARIS, Asst. Prof. V. B., C.E. (Ohio State) Ohio State Univ., Columbus, Ohio. *403 E. Oakland Ave.*
CARLEN, MILDRED E., M.S. (Brown) Instr., Brown Univ., Providence 12, R.I.
CARLSON, Prof. C. S., M.S. (Iowa) Head of Dept., St. Olaf Coll., Northfield, Minn.
CARLSON, Prof. J. A., M.S. (Washington) Head of Dept., Whitworth Coll., Spokane, Wash.
CARLSON, Asst. Prof. S. ELIZABETH, Ph.D. (Minnesota) Univ. of Minnesota, Minneapolis, Minn. *3024-14th Ave. S.*
CARMAN, M. G., Ph.D. (Illinois) Head of Dept., State Teachers Coll., Murray, Ky. *Box 63 College Sta.*
CARMICHAEL, Prof. F. L., A.M. (Princeton) Statistics, Univ. of Denver, Denver, Colo. *2230 Colorado Blvd.*
CARMICHAEL, Prof. R. D., Ph.D. (Princeton) Dean of Grad. School, Univ. of Illinois, Urbana, Ill. *207 W. Washington Blvd.*
CARPENTER, Prof. D. R., A.M. (Princeton) Math. and Astr., Roanoke Coll., Salem, Va.
CARPENTER, Asso. Prof. P. N., M.S. (Washington) Grove City Coll., Grove City, Pa. *214 E. Pine St.*
CARR, Prof. F. E., Ph.D. (Chicago) Oberlin Coll., Oberlin, Ohio. *284 Forest St.*
CARROLL, C. L., Jr., A.M. (North Carolina) *Ensign, U.S.N.R.; Instr., Navigation, U.S. Navy Pre-Flight School, Chapel Hill, N.C. 698 Gimghoul Road*
CARROLL, Asso. Prof. I. S., A.M. (Columbia) Syracuse Univ., Syracuse, N.Y. *511 Comstock Ave.*
CARSCALLEN, Asso. Prof. G. E., A.M. (Illinois) Wabash Coll., Crawfordsville, Ind. *112 N. Barr St.*
CARSON, Prof. T. C., A.M. (Duke) State Teachers Coll., Johnson City, Tenn.
CARTER, C. C. Attorney, Bluffs, Ill. Honorary Life Member

CARVER, Prof. W. B., Ph.D. (Johns Hopkins) Cornell Univ., Ithaca, N.Y. *White Hall*
CASE, Rev. J. E., Ph.D. (Chicago) Head of Dept., St. Louis Univ., St. Louis, Mo.
CATON, W. B., Ph.D. (Yale) Instr., Illinois Inst. of Tech., Chicago, Ill. *6122 Kimbark Ave.*
CAVALLI, S. F., D.Sc. (Royal Inst. Industrial, Milan) Research Engr., Philco Corp., Philadelphia, Pa. *271 S. 58th St.*
CAWLEY, Asso. Prof. JOHN, M.S. (Lafayette) Lafayette Coll., Easton, Pa. *631 Coleman St.*
CEBULA, Rev. RICHARD, M.S. (Michigan) Grad. student, Univ. of Michigan, Ann Arbor, Mich. *326 N. Ingalls*
CEDERBERG, Prof. W. E., Ph.D. (Wisconsin) Augustana Coll., Rock Island, Ill. *2542-22½ Ave.*
CELAURO, F. L., A.M. (New York Univ.) Instr., Syracuse Univ., Syracuse, N.Y. *101 E. Lafayette Ave.*
CELL, Asso. Prof. J. W., Ph.D. (Illinois) Engg. Coll., North Carolina State Coll., Raleigh, N.C. *Box 5548 State College Sta.*
CERINO, RAPHAEL, A.B. (Brooklyn) *Seaman, U.S.N. 2898 Pitkin Ave., Brooklyn, N.Y.*
CHANEY, J. G., A.M. (Texas) *In Service*
CHAROSH, MANNIS, M.S. (New York Univ.) Teacher, New Utrecht High School, Brooklyn, N.Y. *8305-19th Ave.*
CHASE, L. R. Teacher, Rogers High School, Newport, R.I. *Boulevard Terrace*
CHELLEVOLD, Asst. Prof. J. O., A.M. (Northwestern) Wartburg Coll., Waverly, Iowa. *Lt., U.S.N.R., Midshipmen's School, New York 27, N.Y. 419 West 119 St., Apt. 6B*
CHENEY, Prof. W. F., Jr., Ph.D. (Mass. Inst. of Tech.) Head of Dept., Univ. of Connecticut, Storrs, Conn.
CHERRY, L. B., A.M. (Texas) Physicist, Engr., The Brown Instrument Co., Philadelphia, Pa. *2121 Washington Lane, Philadelphia 38, Pa.*
CHESNA, JOHN. Physicist, Eastman Kodak Co., Rochester, N.Y. *12 Otilla St., Rochester 5, N.Y.*
CHIN, LOUISE H., A.B. (California) Teaching Asst., Univ. of California, Berkeley, Calif. *805 Stockton St., San Francisco, Calif.*
CHITTENDEN, Prof. E. W., Ph.D. (Chicago) Univ. of Iowa, Iowa City, Iowa. *221 Physics Bldg.*
CHRISTENSEN, D. L., A.M. (Nebraska) Address unknown
CHRISTIE, D. E., Ph.D. (Princeton) Math. and Physics, Bowdoin Coll., Brunswick, Me. *36 Boody St.*
CHRISTMAN, LAURA E., A.M. (Wisconsin) Teacher, Senn High School, Chicago, Ill. *1217 Elmdale Ave.*
CHURCH, Asst. Prof. RANDOLPH, Ph.D. (Yale) Postgrad. School, U.S. Naval Acad., Annapolis, Md. *Lt., U.S.N.R., 316 N. Glen Ave., Annapolis, Md.*
CHURCHILL, Prof. R. V., Ph.D. (Michigan) Univ. of Michigan, Ann Arbor, Mich. *924 S. Forest Ave.*
CIVIN, PAUL, Ph.D. (Duke) Instr., Univ. of Buffalo, Buffalo, N.Y. *32 Avery Ave., Buffalo 16, N.Y.*
CLARK, Asso. Prof. A. G., A.M. (Colorado) Colorado State Coll. of A. and M. A., Fort Collins, Colo.
CLARK, Asso. Prof. B. G., Ph.D. (Illinois) Univ. of Alabama, University, Ala.
CLARK, C. R., A.M. (Michigan) Teacher, McKinley High School, Washington, D.C. *2707 Adams Mill Road N.W.*
CLARKE, Prof. E. H., Ph.D. (Chicago) Hiram Coll., Hiram, Ohio. *Box 283*
CLARKE, Mrs. L. BEATRICE, A.M. (Michigan) Instr., Florida A. and M. Coll., Tallahassee, Fla. *Box 111, A. and M. Coll.*
CLARKE, Sister M. BORGIA, A.M. (Catholic Univ.) Prof., Webster Coll., Webster Groves, Mo.
CLARKE, WALTER B. Senior partner, W. B. Clarke & Co., Nurserymen, San Jose, Calif. *848 N. First St.*
CLAUDIAN, Prof. VIRGIL, Grad. (Univ. of Bucharest) Liceul Mihai Viteazul, Bucharest 4, Roumania
CLAWSON, Prof. J. W., A.M. (New Brunswick) Ursinus Coll., Collegeville, Pa. *6 Glenwood Ave.*
CLELAND, Prof. W. E., Ph.D. (Princeton) Geneva Coll., Beaver Falls, Pa.
CLEMENT, MARY D., Ph.D. (Chicago) Instr., Wells Coll., Aurora, N.Y.
CLEMENTS, Prof. G. R., Ph.D. (Harvard) U.S. Naval Acad., Annapolis, Md. *7 Thompson St.*
CLIFFORD, Asst. Prof. A. H., Ph.D. (Calif. Inst. of Tech.) Massachusetts Inst. of Tech., Cambridge, Mass. *Lt. (j.g.), U.S.N.R.*
CLIFFORD, P. C., A.M. (Columbia) Instr., State Teachers Coll., Upper Montclair, N.J.
CLUTZ, Prof. F. H., Ph.D. (Johns Hopkins) Emeritus, Gettsyburg Coll., Gettysburg, Pa. *159 Broadway*

COBLE, Prof. A. B., Ph.D. (Johns Hopkins) Univ. of Illinois, Urbana, Ill. *702 W. Washington Blvd.*

COE, Asst. Prof. C. J., Ph.D. (Harvard) Univ. of Michigan, Ann Arbor, Mich. *2022 Hill St.*

COFFIN, Prof. L. M., A.M. (Michigan) Coe Coll., Cedar Rapids, Iowa. *1027 Second Ave.*

COHEN, Prof. ABRAHAM, Ph.D. (Johns Hopkins) Emeritus, Johns Hopkins Univ., Baltimore 18, Md. *Teaching in war training program, Johns Hopkins Univ.*

COHEN, A. C., Jr., Ph.D. (Michigan) Chief, Quality Control, Picatinny Arsenal, Dover, N.J.

COHEN, Prof. L. W., Ph.D. (Michigan) Univ. of Kentucky, Lexington, Ky. *Visiting lecturer, Univ. of Wisconsin, Madison, Wis. Dept. of Math.*

COHEN, Asso. Prof. TERESA, Ph.D. (Johns Hopkins) Pennsylvania State Coll., State College, Pa. *315 S. Atherton St.*

COKER, R. L., A.M. (Alabama) Instr., Physics, Mississippi State Coll., State College, Miss. *206 E. Wood St., Starkville, Miss.*

COLE, NANCY, Ph.D. (Radcliffe) Instr., Sweet Briar Coll., Sweet Briar, Va. *Visiting Asst. Prof., Kenyon Coll., Gambier, Ohio*

COLE, R. H., Ph.D. (Wisconsin) Instr., Univ. of Western Ontario, London, Ont., Can.

COLEMAN, Asst. Prof. E. P., M.S. (Iowa) Univ. of Omaha, Omaha, Nebr. *Major, Coast Artillery Corps; Instr., U.S. Military Acad., West Point, N.Y. Dept. of Math.*

COLEMAN, Prof. J. B., Ph.D. (California) Univ. of Richmond, Richmond, Va.

COLEMAN, RUTH T., A.M. (Columbia) Instr., Bergen Jr. Coll., 1000 River Road, Teaneck, N.J.

COLEMAN, W. B., A.M. (Lehigh; Harvard) *2nd Lt., Ground School, Aviation Cadet Center, San Antonio, Tex. 514 Roslyn Ave.*

COLLIER, MYRTIE, Ph.D. (Strasbourg) Chm. of Dept., Immaculate Heart Coll., Los Angeles, Calif. *235 Thurston Ave., Los Angeles 24, Calif.*

COLSON, H. D., A.B. (Minnesota) Instr., Univ. of Minnesota, Minneapolis, Minn. *122 Folwell Hall*

COLYER, Prof. E. E., A.M. (Kansas) Fort Hays Kansas State Coll., Hays, Kans. *408 W. 15th St.*

COMBELLACK, W. J., A.M. (Colby) Instr., Northeastern Univ., 360 Huntington Ave., Boston, Mass.

COMER, LOUISE M., M.S. (Brown) Lecturer, Barnard Coll., 607 West 119 St., New York, N.Y.

COMFORT, E. G. H., Ph.D. (Brown) Instr., Univ. of Arkansas, Fayetteville, Ark. *Major, Air Corps. 812 Prairie Ave., Wilmette, Ill.*

COMSTOCK, Prof. C. E., Sc.D (Knox) Emeritus, Bradley Poly. Inst., Peoria, Ill. *203 Fredonia Ave., Peoria 5, Ill.*

CONGDON, Prof. A. R., Ph.D. (Columbia) Secondary Educ., Univ. of Nebraska, Lincoln, Nebr. *Station A*

CONGER, L. H., Jr., A.M. (Harvard) *Lt., Army Air Force. 560 W. Webster Ave., Muskegon, Mich.*

CONKWRIGHT, Asso. Prof. N. B., Ph.D. (Illinois) Univ. of Iowa, Iowa City, Iowa. *209-B Physics Bldg.*

CONSTABLE, MARY LOUISE, A.M. (Pennsylvania) Teacher, Philadelphia High School for Girls, Philadelphia, Pa. *The Whittier, 140 N. 15th St., Philadelphia 2, Pa.*

CONWELL, G. M., Ph.D. (Princeton) Master in Math., St. Paul's School, Concord, N.H. *307 Pleasant St.*

CONWELL, Prof. H. H., Ph.D. (Wisconsin) Dean, Beloit Coll., Beloit, Wis. *1621 Emerson St.*

COOK, Asso. Prof. A. J., Ph.D. (Chicago) Univ. of Alberta, Edmonton, Alta., Can.

COOK, Sister ROSE MARGARET, M.S. (Notre Dame) Prof., Loretto Heights Coll., Loretto, Colo.

COOKE, Asst. Prof. J. V., Ph.D. (Peabody) North Texas State Teachers Coll., Denton, Tex. *1st Lt., Air Corps. 3515 Lee St., Greenville, Tex.*

COOLEY, Asso. Prof. H. R., Ph.D. (New York Univ.) New York Univ., 100 Washington Sq. E., New York, N.Y. *Visiting Prof., Navigation, Drew Univ., Madison, N.J.*

COOLEY, Prof. J. A., Ph.D. (Illinois) Head of Dept., Univ. of Tennessee, Knoxville, Tenn.

COOLIDGE, Prof. J. L., Ph.D. (Bonn), LL.D. (Harvard) Emeritus, Harvard Univ., Cambridge, Mass. *27 Fayerweather St.*

COOPER, CLARA M., A.M. (Pennsylvania State) Head of Dept., St. Vincent's Coll., Shreveport, La.

COOPER, ELIZABETH M., Ph.D. (Illinois) Chm. of Dept., Hunter Coll. High School, New York, N.Y. *201 East 71 St.*

COPE, Asso. Prof. T. F., Ph.D. (Chicago) Chm. of Dept., Queens Coll., Flushing, N.Y. *33-69 167th St.*

COPELAND, Prof. A. H., Ph.D. (Harvard) Univ. of Michigan, Ann Arbor, Mich.

COPELAND, Prof. LENNIE P., Ph.D. (Pennsylvania) Wellesley Coll., Wellesley, Mass. *14 Waban St.*

COPP, P. T., A.M. (Ohio State) Industrial Engr., Carnegie Illinois Steel Works, Gary, Ind. *Box 64, Porter, Ind.*

CORBIN, Prof. C. E., A.M. (Northwestern) Coll. of the Pacific, Stockton, Calif.

CORDREY, W. A., Ph.D. (Peabody) *Pvt., U.S. Army. 3830 Clermont Drive, New Orleans 17, La.*

CORLISS, J. J., Ph.D. (Michigan) Chm. of Dept., De Paul Univ., 64 East Lake St., Chicago, Ill.

CORONA, Sister MARIA, Ph.D. (Fordham) Dean and Prof., Coll. of Mount St. Joseph, Mount St. Joseph, Ohio

CORRAL Y ALEMÁN, J. I., Ing. de Minas. Dir. de Montes y Minas, Republic of Cuba, Havana, Cuba. *Calzada esquina 13, Vedado*

COSBY, BYRON, A.M. (Missouri) Owner, Teacher Placement Bureau, Columbia, Mo. *One Ridgeley Road*

COTHRAN, Prof. J. C., Ph.D. (Cornell) Head of Dept. of Chem., State Teachers Coll., Duluth, Minn. *512 N. 19th Ave. E., Duluth 5, Minn.*

COULTER, W. H., Licentiate of instruction (Peabody) Retired, Railway mail clerk, *134 N. Summit Ave., Decatur, Ill.*

COURANT, Prof. RICHARD, Ph.D. (Göttingen) Chm. of Dept., New York Univ., New York, N.Y. *142 Calton Road, New Rochelle, N.Y.*

COURT, Prof. N. A., D.Sc. (Ghent, Belgium) Univ. of Oklahoma, Norman, Okla.

COWAN, R. W., Ph.D. (California) Instr., Univ. of Alabama, University, Ala. *1409 Tenth St., Tuscaloosa, Ala.*

COWLES, Prof. W. H. H., A.M. (Columbia) Head of Dept., Pratt Inst., Brooklyn, N.Y. *Director, A.S.T. Program*

COX, Asst. Prof. H. M., A.M. (Duke) Dir., Bureau of Instructional Research, Univ. of Nebraska, Lincoln 8, Nebr. *B-3 Admin. Bldg.*

COX, P. C., A.M. (New Mexico) *2nd Lt., Air Corps, Academic Dept., A.A.F.P.F.S.(P), Maxwell Field, Ala.*

COXETER, Asso. Prof. H. S. M., Ph.D. (Cambridge) Univ. of Toronto, Toronto, Ont., Can. *24 Strathearn Blvd.*

CRAFT, PLUMMER, B.S. (Mississippi State) *In Service*

CRAIG, Asso. Prof. A. T., Ph.D. (Iowa) Univ. of Iowa, Iowa City, Iowa. *119 Physics Bldg.*

CRAIG, Prof. C. C., Ph.D. (Michigan) Univ. of Michigan, Ann Arbor, Mich. *3020 Angell Hall*

CRAIG, Prof. H. V., Ph.D. (Wisconsin) Math. and Astr., Univ. of Texas, Austin, Tex. *1816 West 36 St.*

CRAIN, K. W., M.S. (Iowa) Instr., Purdue Univ., West Lafayette, Ind. *338 Lincoln St.*

CRAMER, Asst. Prof. G. F., Ph.D. (Missouri) Tulane Univ., New Orleans, La. *Lt., U.S.N.R., 3026 Porter St. N.W., Washington 8, D.C.*

CRAMER, PAUL, A.M. (Illinois) Instr., Ely Jr. Coll., Ely, Minn. *Instr., War training program, Denison Univ., Granville, Ohio. 129 N. Plum St., Granville, Ohio*

CRAMLET, Asso. Prof. C. M., Ph.D. (Washington) Univ. of Washington, Seattle, Wash. *Dept. of Math.*

CRANE, Asso. Prof. RUFUS, A.M. (Ohio State) Ohio Wesleyan Univ., Delaware, Ohio. *269 W. William St.*

CRANE, R. E., B.S. (Harvard) Amer. Tel. and Tel. Co., 195 Broadway, New York, N.Y. *120 Early St., Morristown, N.J.*

CRATHORNE, Prof. A. R., Ph.D. (Göttingen) Univ. of Illinois, Urbana, Ill. *802 Pennsylvania Ave.*

CRAWFORD, Rev. J. A., A.M. (Johns Hopkins) Prof., Physics, Villanova Coll., Villanova, Pa.

CRAWFORD, Asst. Prof. W. S. H., A.M. (Minnesota) Mount Allison Univ., Sackville, N.B., Can.

CRISPIN, J. W., JR. Student, Univ. of Michigan, Ann Arbor, Mich. *1000 Hill St.*

CROMWELL, J. W., Jr., A.M. (Dartmouth) Certified Pub. Accountant, Washington, D.C. *1815-13th St., N.W.*

CROW, E. L., Ph.D. (Wisconsin) Bur. of Ordnance, Navy Dept., Washington, D. C. *119 Fifth St. N.E., Washington 2, D.C.*

CRUDELI, Prof. UMBERTO, Dr. in mat. (Rome) Mathl. physics, Univ. of Naples, Naples, Italy

CRULL, Prof. H. E., Ph.D. (Illinois) Chm. of Dept., Math. and Astr., Park Coll., Parkville, Mo. *Lt.(j.g.), U.S.N.R.*

CULMER, Prof. ORPHA ANN, A.M. (Michigan) Head of Dept., State Teachers Coll., Florence, Ala. *College Station*

CUMMING, Prof. FORREST, A.M. (Georgia) Univ. of Georgia, Athens, Ga. *Box 774*

CUNHA, Prof. P. J. DA. Analysis, Faculty of Sci., Univ. of Lisbon, Lisbon, Portugal. *Rua de S. Bento, Nr. 706*

CUNNINGHAM, A. B., Ph.D. (West Virginia) Instr., Pennsylvania State Coll., State College, Pa. *Dept. of Math.*
CURFMAN, Prof. L. E., M.S. (Colorado) Kansas State Teachers Coll., Pittsburg, Kans. *406 W. Adams St.*
CURRIE, Asst. Prof. J. C., A.M. (Mississippi) Northeast Jr. Coll. of L.S.U., Monroe, La.
CURRIER, Asst. Prof. A. E., Ph.D. (Harvard) U.S. Naval Acad., Annapolis, Md. *Dept. of Math.*
CURRY, Prof. H. B., Ph.D. (Göttingen) Pennsylvania State Coll., State College, Pa. *Applied Physics Lab., 8621 Georgia Ave., Silver Spring, Md.*
CURTIS, Prof. H. B., Ph.D. (Cornell) Lake Forest Coll., Lake Forest, Ill. *11 College Campus*
CURTISS, Prof. D. R., Ph.D. (Harvard) Emeritus, Northwestern Univ., Evanston, Ill.
CURTISS, Asst. Prof. J. H., Ph.D. (Harvard) Cornell Univ., Ithaca, N.Y. *Lt. (j.g.), U.S.N.R., Bureau of Ships, Washington, D.C.*
CUTLER, Asst. Prof. E. H., Ph.D. (Harvard) Lehigh Univ., Bethlehem, Pa.
CUTTING, L. H., A.M. (Missouri) Teacher, Westport High School, Kansas City 4, Mo. *406 E. 43rd St.*

DADOURIAN, Prof. H. M., Ph.D. (Yale) Math. and Nat. Philos., Trinity Coll., Hartford, Conn. *125 Vernon St.*
DALAL, R. D. Stock Broker, retired, London, England
DAMSGARD, Asst. Prof. L. C., A.B. (Union Coll., Nebr.) Math. and Astr., Pasadena Jr. Coll., Pasadena, Calif. *2000 Loma Vista St., Pasadena 7, Calif.*
DANCER, Prof. WAYNE, Ph.D. (Michigan) Univ. of Toledo, Toledo, Ohio. *2233 Dundas Road*
DANCEY, Prof. L. S., A.M. (Illinois) Carroll Coll., Waukesha, Wis. *125 N. Charles St.*
DANIELLS, Asst. Prof. MARIAN E., A.M. (Iowa State) Iowa State Coll., Ames, Iowa. *Dept. of Math.*
DANSKIN, J. M., Jr., A.B. (U.C.L.A.) *Seaman, First Class, U.S.N.R.*
DANZL, Rev. ARTHUR, A.M. (Columbia) Prof., St. John's Univ., Collegeville, Minn.
DAOUST, J. H., A.M. (Minnesota) *1st Lt., Army Air Forces. 622 W. Princeton St., Orlando, Fla.*
DAPPERT, J. W., C.E. (Valparaiso Univ.) Civil Engineer, Taylorville, Ill. *505 Gandy Ave.*
D'ARCO, PAUL, B.S. (Chicago) Instr., De Paul Univ., Chicago, Ill. *1116 W. Polk St.*
DARKOW, Asso. Prof. MARGUERITE D., Ph.D. (Chicago) Hunter Coll., 695 Park Ave., New York, N.Y. *16 East 82 St., New York 28, N.Y.*
DARRAUGH, J. E., A.M. (Brooklyn) Clerk, Consolidated Edison Co., 4 Irving Pl., New York, N.Y. *2nd Lt., Army Air Forces. 2917 Glenwood Road, Brooklyn, N.Y.*
D'ATRI, A. J., C.E. (Brooklyn Poly. Inst.) Civil Engr., Dept. of Public Works, New York, N.Y. *1821 Madison Pl., Brooklyn, N.Y.*
DAUGHERTY, Asst. Prof. R. D., M.S. (Iowa) Kansas State Coll., Manhattan, Kans.
DAUM, J. A., Ph.D. (Nebraska) Instr., A. and M. Coll. of Texas, College Station, Tex. *1st Lt., A.U.S., Signal Corps. 337 Sylvania Ave., Avon-by-the-Sea, N.J.*
DAUS, Prof. P. H., Ph.D. (California) Univ. of California at Los Angeles, Los Angeles 24, Calif.
DAVIS, A. W., Ph.D. (Iowa State) Instr., Theoret. and Appl. Mech., Iowa State Coll., Ames, Iowa
DAVIS, Prof. D. R., Ph.D. (Chicago) State Teachers Coll., Montclair, N.J.
DAVIS, Asso. Prof. H. A., Ph.D. (Cornell) West Virginia Univ., Morgantown, W. Va. *307 Duquesne Ave.*
DAVIS, Dean J. B., M.S. (Northwestern) Itasca Jr. Coll., Coleraine, Minn.
DAVIS, J. E., A.M. (Ohio State) Asso., Pharmacy, Univ. of Illinois, 808 S. Wood St., Chicago 7, Ill.
DAVIS, Prof. J. E., A.M. (Wisconsin) Drexel Inst. of Tech., 32nd and Chestnut St., Philadelphia, Pa.
DAVIS, MARGARET R., Ed.D. (Columbia) Instr., Math. and Sci., Greenbrier Coll., Lewisburg, W. Va.
DAVIS, Asst. Prof. U. P., A.M. (Florida) Univ. of Florida, Gainesville, Fla. *1635 W. Mechanic St.*
DAVIS, Asst. Prof. W. M., Ph.D. (Chicago) Cornell Coll., Mount Vernon, Iowa. *603 N. Sixth St. W.*
DAVISON, Asso. Prof. RACHEL, A.M. (Oberlin) Houghton Coll., Houghton, N.Y. *Box 156*
DEAN, ALICE C., A.M. (Rice) Fellow in Math., Acting Librarian, Rice Inst., Houston, Tex. *Library, P.O. Box 1892*
DEARBORN, Prof. D. C., Ph.D. (Duke) Registrar, Catawba Coll., Salisbury, N.C.
DECHERD, Asst. Prof. MARY E., A.M. (Texas) Univ. of Texas, Austin, Tex. *2313 Nueces St.*
DECICCO, Asst. Prof. JOHN, Ph.D. (Columbia) Illinois Inst. of Tech., 3300 Federal St., Chicago, Ill. *6340 Blackstone Ave.*
DECK, Prof. L. J., A.M. (Pennsylvania) Muhlenberg Coll., Allentown, Pa.

DECKER, Prof. F. F., Ph.D. (Syracuse) Syracuse Univ., Syracuse, N.Y. *312 Marshall St.*
DECLEENE, Rev. L. A. V., Ph.D. (Catholic Univ.) Prof., St. Norbert Coll., West DePere, Wis. *St. Norbert Abbey*
DECOU, Prof. E. E., M.S. (Chicago) Emeritus, Univ. of Oregon, Eugene, Ore. *929 Hilyard St.*
DEDERICK, L. S., Ph.D. (Harvard) Principal mathematician, Ballistic Research Lab., Aberdeen Proving Ground, Md.
DE LA GARZA, ELEUTERIO. Box 304, Brownsville, Tex.
DE LA SALLE (SEILER), Brother LOUIS, Ph.D. (Catholic Univ.) Prof., Dean of Studies, St. Mary's Coll., Winona, Minn.
DEMING, Prof. R. M., M.S. (Iowa State) Registrar, Upper Iowa Univ., Fayette, Iowa
DEMOSS, M. L., M.S. (Kansas St. T. C., Pittsburg) Instr., General Motors Inst., Flint, Mich. *Ensign, U.S.N.R., 38 Foxholm, New Dorp, Staten Island 6, N.Y.*
DENBOW, Asst. Prof. CARL, Ph.D. (Chicago) Ohio Univ., Athens, Ohio. *Lt (j.g.), U.S.N.R.*
DENNIS, Asst. Prof. F. L., Ph.D. (Illinois) Ursinus Coll., Collegeville, Pa.
DENNISON, C. H., B.S. (Mass. Inst. of Tech.) Chemist, Archer Rubber Co., Milford, Mass. *183 Norfolk St., Wollaston, Mass.*
DENTON, W. W., Ph.D. (Illinois) Dean, Great Lakes Coll., Detroit 3, Mich. *4211 Third Ave., Detroit 1, Mich.*
DIAMOND, A. H., Ph.D. (California) *Lt., U.S. Army*
DICKINSON, MYRTLE F., M.S. (Catholic Univ.) Teacher, John McDonogh High School, New Orleans, La. *810 Louisa St., New Orleans 17, La.*
DICKSON, Prof. L. E., Ph.D. (Chicago) Emeritus, Univ. of Chicago, Chicago, Ill. Honorary Life Member
DILLINGHAM, Prof. ALEXANDER, A.M. (Harvard) U.S. Naval Acad., Annapolis, Md.
DILWORTH, Asst. Prof. R. P., Ph.D. (Calif. Inst. of Tech.) California Inst. of Tech., Pasadena, Calif. *204 Astrophysics Bldg.*
DIMICK, Prof. C. E., A.M. (Pennsylvania) U.S. Coast Guard Acad., New London, Conn. *Captain*
DIMSDALE, BERNARD, Ph.D. (Minnesota) *In Service*
DINES, Prof. L. L., Ph.D. (Chicago) Head of Dept., Carnegie Inst. of Tech., Pittsburgh, Pa.
DINKINES, FLORA, A.M. (Michigan) Instr., Univ. of South Carolina, Columbia, S.C. *Dept. of Math.*
DIX, Prof. L. E., B.S. (Tufts) Norwich Univ., Northfield, Vt. *5 Spring St.*
DOBBIN, Sister MARIOLA, A.M. (Wisconsin) Prof., Rosary Coll., River Forest, Ill.
DOBELL, Prof. H. A., Ph.D. (Cornell) New York State Coll. for Teachers, Albany, N.Y. *10 Herber Ave., Elsmere, N.Y.*
DOBSON, W. P., M.A. (Toronto) Dir. of Research, Hydro Electric Power Commission of Ontario, 620 University Ave., Toronto 2, Ont., Can.
DOERFLER, HILARY, A.M. (St. John's Univ., Minn.) Head of Dept., St. Gregory's Coll., Shawnee, Okla.
DOERMANN, Asst. Prof. F. W., Ph.D. (Vienna) Physics, New York Univ., University Heights, New York, N.Y.
DONALDSON, J. D., A.M. (Pittsburgh) Teacher, High School, West Newton, Pa.; Lecturer, Univ. of Pittsburgh, Pittsburgh, Pa. *1030 Milton Ave., Regent Sq., Swissvale, Pa.*
DONCHIAN, P. S., A.B. (Yale) Vice-Pres. and Treas., Samuel Donchian Rug Co., Hartford, Conn. *85 Gillett St.*
DONER, Prof. R. D., Ph.D. (Illinois) Head of Dept., Alabama Poly. Inst., Auburn, Ala. *477 E. Samford Ave.*
DORROH, Asst. Prof. J. L., Ph.D. (Texas) Louisiana State Univ., University Sta., Baton Rouge, La. *Dept. of Math.*
DORWART, Asst. Prof. H. L., Ph.D. (Yale) Washington and Jefferson Coll., Washington, Pa. *R.D. 6*
DOSTAL, Asst. Prof. B. F., A.M. (Indiana) Univ. of Florida, Gainesville, Fla. *106 Peabody Bldg.*
DOTTERER, Prof. J. E., A.M. (Illinois) Math. and Physics, Indiana Central Coll., Indianapolis, Ind.
DOUGHERTY, LUCY T., A.M. (Kansas) Instr., Univ. of Kansas, Lawrence, Kans. *1108 Ohio St.*
DOUGLAS, Asst. Prof. JESSE, Ph.D. (Columbia) Brooklyn Coll., Brooklyn, N.Y. *878 West End Ave., New York, N.Y.*
DOUGLASS, Prof. R. D., Ph.D. (Mass. Inst. of Tech.) Massachusetts Inst. of Tech., Cambridge, Mass. *18 Oak Ave., Belmont, Mass.*
DOUGLASS, Prof. R. L., A.M. (J. C. Smith Univ.) Johnson C. Smith Univ., Charlotte, N.C.
DOWNING, F. A. Asst. director of traffic, North Carolina Utilities Com., Raleigh, N.C. *212 Taylor St.*

DOWNING, Prof. H. H., Ph.D. (Chicago) Math. and Astr., Univ. of Kentucky, Lexington, Ky. *138 State St., Lexington 36, Ky.*
DOWNING, R. H., Ph.D. (West Virginia) Analyst, Engineering Dept., Fleetwings, Inc., Bristol, Pa.
DOYLE, Asst. Prof. W. C., Ph.D. (St. Louis Univ.) Rockhurst Coll., Kansas City 4, Mo.
DOYLE, Rev. W. G., M.S. (Catholic Univ.) *In Service*
DRAPER, Prof. OLIVE M., A.M. (Michigan) Taylor Univ., Upland, Ind.
DRESDEN, Prof. ARNOLD, Ph.D. (Chicago) Swarthmore Coll., Swarthmore, Pa. *606 Elm Ave.*
DRESSEL, Asst. Prof. F. G., Ph.D. (Duke) Duke Univ., Durham, N.C. *309 Francis St.*
DRESSLER, B. B., A.M. (Illinois) Instr., Alabama Poly. Inst., Auburn, Ala. *Box 206*
DREW, Asst. Prof. J. W., A.M. (Cornell) Virginia Union Univ., Richmond, Va.
DRIBIN, D. M., Ph.D. (Chicago) *Technical Sergeant, Signal Corps, 3121-16th St. N.W., Washington, D.C.*
DRIVER, D. D., A.M. (Nebraska) Registrar, Instr., Math. and Sci., Hesston Coll., Hesston, Kans.
DUBÉ, Prof. L. H., Ph.D. (Gregorian Univ., Rome) Ottawa Univ., Ottawa, Ont., Can.
DUERKSEN, J. A., A.B. (Bethel) Mathematician, U.S. Coast and Geodetic Survey, Washington 18, D.C. *3134 Monroe St. N.E.*
DUFFNER, R. T., G.E. (Colorado School of Mines) *Ensign, U.S.N.R., 2801 E. Colfax Ave., Denver 6, Colo.*
DUNCAN, D. C., Ph.D. (California) Instr., Los Angeles City Coll., 851 N. Vermont Ave., Los Angeles, Calif.
DUNFORD, Prof. NELSON, Ph.D. (Brown) Yale Univ., New Haven, Conn. *374 Fountain St.*
DUNKEL, Prof. OTTO, Ph.D. (Harvard) Emeritus, Washington Univ., St. Louis, Mo.
DUNLAP, Asst. Prof. L. T., A.M. (Pennsylvania State) Pennsylvania State Coll., State College, Pa. *Lt., U.S.N.R.*
DUNLAP, P. R., A.B. (Taylor Univ.) Kalkaska, Mich.
DUPASQUIER, Prof. L. G., Ph.D. (Zurich) Univ. of Neuchâtel, Neuchâtel, Switzerland
DURAIRAJAN, N. Exec. Engr., Mylapore, Madras, India. *33 C Elliots Road*
DURAND, JANET C., A.M. (Pennsylvania) Instr., Vassar Coll., Poughkeepsie, N.Y. *One La-Grange Ave.*
DURELL, FLETCHER, Ph.D. (Princeton) Emeritus, Head of Dept., Lawrenceville School, Lawrenceville, N.J. *Belleplain, Woodbine R.F.D., N.J.*
DUREN, Asso. Prof. W. L., Jr., Ph.D. (Chicago) Tulane Univ., New Orleans 15, La. *Dept. of Math.*
DURFEE, W. H., A.M. (Harvard) Instr., Yale Univ., New Haven, Conn. *327 Harkness Hall*
DURFEE, Prof. W. H., Ph.D. (Cornell) Dean, Hobart Coll., Geneva, N.Y.
DURHAM, R. L., B.S. (Trinity Coll.) President, Southern Sem. and Jr. Coll., Buena Vista, Va.
DUSTHEIMER, Asso. Prof. O. L., Ph.D. (Michigan) John Carroll Univ., University Heights, Cleveland 18, Ohio
DUVAL, Prof. E. P. R., A.M. (Harvard) Univ. of Oklahoma, Norman, Okla. *1505 Oklahoma Ave.*
DWYER, Asso. Prof. P. S., Ph.D. (Michigan) Univ. of Michigan, Ann Arbor, Mich. *2509 James St.*
DWYER, Asso. Prof. W. A., Ph.D. (Nebraska) Creighton Univ., Omaha, Nebr.
DYE, Asst. Prof. L. A., Ph.D. (Cornell) The Citadel, Charleston, S.C.

EAGLE, E. L., A.B. (Miami) Head of Dept., Dayton Y.M.C.A. Coll., Dayton, Ohio. *U.S.A. Air Corps. 834 Court O, Wheldon Park Homes, Springfield, Ohio*
EARHART, FRANC C., A.M. (Wisconsin) Lenox Coll., Hopkinton, Iowa
EARL, Prof. J. M., Ph.D. (Minnesota) Municipal Univ. of Omaha, Omaha, Nebr. *528 S. 53rd St.*
EASON, Prof. C. R., M.S. (Rutgers) Shaw Univ., Raleigh, N. C. *705 S. Blount St.*
EASTHAM, J. N., Ph.D. (Catholic Univ.) Head of Dept., Nazareth Coll., Rochester, N.Y. *74 Eastland Ave., Rochester 7, N.Y.*
EAVES, Asso. Prof. E. D., Ph.D. (Texas) Univ. of Tennessee, Knoxville, Tenn. *University Sta.*
EBERHART, Prof. PAUL, Ph.D. (Brown) Head of Dept., Math. and Engg., Washburn Univ., Topeka, Kans. *2068 Lane St.*
EDINGTON, Prof. W. E., Ph.D. (Illinois) Head of Dept., Math. and Astr., DePauw Univ., Greencastle, Ind. *E. Franklin St.*
EDISON, T. M., B.S. (Mass. Inst. of Tech.) Pres., Calibron Products, Inc., 51 Lakeside Ave., West Orange, N.J.
EDMONSON, Prof. NAT, Jr., Ph.D. (Rice) A. and M. Coll. of Texas, College Station, Tex. *Box 121 Faculty Exchange*
EDWARD JOSEPH, Sister, A.M., M.S. (Notre Dame) Instr., St. Mary's Coll., Notre Dame, Holy Cross, Ind.

EDWARDS, Prof. P. D., Ph.D. (Indiana) Ball State Teachers Coll., Muncie, Ind.
EGGERS, Asst. Prof. H. C. T., Ph.D. (Michigan) Univ. of Minnesota, Minneapolis, Minn. *2100-31st Ave. S.*
EGGERT, O. E. Postal clerk, U. S. Railway Mail Service, Philadelphia, Pa. *1916 Forest Ave., Morton, Pa.*
EICHERT, H. P., A.B. (New York Univ.) Engr., U.S. Coast and Geodetic Survey. *930 East 31 St., Brooklyn, N.Y.*
EIDE, Asso. Prof. MARGARET C. (Mrs. R. B.), A.M. (Wisconsin) State Teachers Coll., River Falls, Wis. *308 S. Second St.*
EIESLAND, Prof. J. A., Ph.D. (Johns Hopkins) Emeritus, West Virginia Univ., Morgantown, W. Va.
EISELE, CAROLYN, A.M. (Columbia) Instr., Hunter Coll., New York, N.Y. *257 West 86 St., New York 24, N.Y.*
EISENHART, Prof. L. P., Ph.D. (Johns Hopkins) Dean of Grad. School, Princeton Univ., Princeton, N.J. *73 Nassau St.*
EKMAN, Prof. W. E., A.M. (South Dakota) Math. and Astr., Univ. of South Dakota, Vermillion, S.D. *104 S. Yale St.*
ELDER, Asso. Prof. J. D., A.M. (Princeton) Math. and Physics, Lynchburg Coll., Lynchburg, Va.
ELLIOTT, Prof. W. W., Ph.D. (Cornell) Duke Univ., Durham, N.C. *Box 533*
ELLIS, J. R., M.S. (New Mexico) Teacher, Booker T. Washington High School, Tulsa, Okla. *1110 E. Pine St., Tulsa 6, Okla.*
ELSTON, J. S., A.B. (Cornell) Asst. Actuary, Travelers Ins. Co., Hartford, Conn.
EMMONS, Prof. C. W., A.M. (Illinois) Registrar, Simpson Coll., Indianola, Iowa
EMMONS, H. W., M.S., M.E. (Stevens) Instr., Mech. Engg., Grad. School of Engineering, Harvard Univ., Cambridge, Mass. *Concord Road, Sudbury, Mass.*
ENGSTROM, Asso. Prof. H. T., Ph.D. (Yale) Yale Univ., New Haven, Conn. *Lt. Comdr., U.S.N.R., Navy Dept., Washington, D.C. 406 N. Thomas St., Arlington, Va.*
ENRIQUES, Prof. FEDERIGO. Univ. of Rome, Rome, Italy. *Via Sardegna 50*
EPSTEIN, BENJAMIN, Ph.D. (Illinois) Mathematician, Frankford Arsenal, Philadelphia, Pa. *8717 Perch Lane, Philadelphia 36, Pa.*
ERICKSON, R. W., Ph.D. (Minnesota) Instr., Hibbing Jr. Coll., Hibbing, Minn. *Lt., U.S. Army, A.G.D. 4315 Fourth Ave. S., Minneapolis, Minn.*
ERIKSON, Asso. Prof. C. M., Ph.D. (Michigan) Michigan State Normal Coll., Ypsilanti, Mich. *101 Wallace Blvd.*
ERKILETIAN, D. H., A.M. (Illinois) Instr., Univ. of Missouri, School of Mines and Met., Rolla, Mo. *202 W. 18th St.*
ERNSBERGER, IVA B., A.M. (Nebraska) Instr., Fullerton Jr. Coll., Fullerton, Calif.
EROKAN, ISLAM, M.C.E. (Cornell) *In Service*
ERRERA, Prof. ALFRED. L'Univ. libre de Bruxelles, Belgium. *1039 Chausée de Waterloo, Uccle 8, Belgium*
ERWIN, GRACE, A.B. (Nebraska) Gilead, Nebr.
ERWIN, M. C. Teacher, Industrial Arts Dept., High School, Reynolds, Ind.
ESPOSITO, J. P., Ed.M. (De Paul) Teacher, Crane Tech. High School, Chicago, Ill. *1640 N. Parkside Ave., Chicago 39, Ill.*
ESTY, Prof. T. C., A.M. (Amherst) Emeritus, Amherst Coll., Amherst, Mass. *Spofford, N.H.*
ETTINGER, W. J., B.S. in M.E. (Lewis Inst.) Designing Engr., Edison Genl. Elec. Appliance Co., 5600 W. Taylor St., Chicago, Ill.
ETTLINGER, Prof. H. J., Ph.D. (Harvard) Univ. of Texas, Austin, Tex. *3110 Harris Park Ave.*
EVANS, Prof. G. C., Ph.D. (Harvard) Head of Dept., Univ. of California, Berkeley 4, Calif. *Dept. of Math.*
EVANS, G. W., A.B. (Harvard) Retired. *16 Beverly Road, Swampscott, Mass.*
EVANS, Prof. H. B., Ph.D. (Pennsylvania) Emeritus, Univ. of Pennsylvania, Philadelphia, Pa. *88 Merbrook Lane, Merion Station, Pa.*
EVANS, Prof. H. P., Ph.D. (Wisconsin) Univ. of Wisconsin, Madison, Wis. *North Hall*
EVERETT, E. E., B.S. (Brigham Young Univ.) Instr., Dixie Jr. Coll., St. George, Utah
EVERETT, Prof. H. S., Ph.D. (Chicago) Extension Prof., Univ. of Chicago, Chicago 37, Ill.
EVERETT, J. P., Ph.D. (Columbia) Chm. of Dept., Western Michigan Coll., Kalamazoo, Mich. *907 W. South St.*
EVERETT, Asso. Prof. J. R., A.M. (Wisconsin) Colorado School of Mines, Golden, Colo. *1700 Washington St.*
EVES, Asst. Prof. H. W., A.M. (Harvard) Syracuse Univ., Syracuse, N.Y. *833 University Ave.*
EWING, Asst. Prof. G. M., Ph.D. (Missouri) Univ. of Missouri, Columbia, Mo. *213 Engineering Bldg.*

FAGERSTROM, Asst. Prof. W. H., Ph.D. (Columbia) Coll. of the City of New York, Convent Ave. and 139 St., New York 31, N.Y. *706 Riverside Drive*

FAIR, Asst. Prof. L. A., A.M. (Peabody) Morehead State Teachers Coll., Morehead, Ky. *468 Second St.*

FALVEY, FRANCES E., A.M. (Southern Methodist) Head of Dept., Ward-Belmont Jr. Coll., Nashville, Tenn.

FARNELL, A. B., M.S. (Louisiana State) *1st Lt., C.A.C., Instr., U.S. Military Acad., West Point, N.Y. Dept. of Math.*

FATTU, NICHOLAS, Ph.D. (Minnesota) Instr., Research statistician, Univ. of Minnesota, Minneapolis, Minn. *303 Eddy Hall*

FAULKNER, F. D., M.S. (Kansas State Coll.) Instr., Univ. of Michigan, Ann Arbor, Mich. *Dept. of Math.*

FAY, E. A., A.M. (Harvard) Address unknown

FEDERICO, P. J., A.M. (George Washington) Principal Examiner, U.S. Patent Office, Washington, D.C. *3634 Jocelyn St. N.W.*

FEEMSTER, Prof. H. C., A.M. (Nebraska) Math. and Astr., York Coll., York, Nebr.

FEHR, Asso. Prof. H. F., Ph.D. (Columbia) State Teachers Coll., Upper Montclair, N.J. *544 Highland Ave.*

FELD, J. M., Ph.D. (Columbia) Instr., Queens Coll., Flushing, N.Y.

FELDER, VIRGINIA I., M.S. (Tulane) Asst. Instr., Radio Mechanics, Truax Field, Madison, Wis. *R.F.D. 1, Magnolia, Miss.*

FELTGES, EDNA M., A.M. (Wisconsin) Chm. of Dept., Woodrow Wilson Jr. Coll., Chicago, Ill. *2552 E. 76th St.*

FERGUSON, W. E., A.M. (Missouri) Instr., Univ. of Missouri, Columbia, Mo. *211 S. Glenwood Ave.*

FERRY, Pres. F. C., Ph.D. (Clark) Emeritus, Hamilton Coll., Clinton, N.Y. *324 Hart St., New Britain, Conn.*

FETTERER, Rev. R. A., M.S. (Catholic Univ.) Instr., St. Francis Seminary, St. Francis, Wis. *3257 S. Lake Drive*

FICKEN, Prof. F. A., Ph.D. (Princeton) Univ. of Tennessee, Knoxville, Tenn.

FIELD, Prof. FLOYD, A.M. (Harvard) Dean of Men, Georgia School of Tech., Atlanta, Ga. *2865 Tupelo Drive*

FIELD, Prof. PETER, Ph.D. (Cornell) Univ. of Michigan, Ann Arbor, Mich. *904 Olivia Ave.*

FIELD, S. E., A.M. (Michigan) Head of Dept., Wright High School, Ironwood, Mich. *635 E. Cloverland Drive*

FIELDS, Asst. Prof. W. L., A.M. (Indiana) Louisville Municipal Coll., Louisville, Ky. *2239 W. Chestnut St.*

FINAN, Asso. Prof. E. J., Ph.D. (Ohio State) Catholic Univ. of America, Washington, D.C. *604 Girard St. N.E.*

FINCH, J. V., A.M. (Wisconsin) *2nd Lt., Air Corps; Instr., Inst. of Meteorology, Univ. of Chicago, Chicago 37, Ill. 6104 S. Woodlawn Ave.*

FINDLAY, Prof. WILLIAM, Ph.D. (Chicago) McMaster Univ., Hamilton, Ont., Can. *162 Haddon N.*

FINE, N. J., A.M. (Pennsylvania) Instr., Purdue Univ., W. Lafayette, Ind. *Dept. of Math.*

FINKEL, Prof. B. F., Ph.D. (Pennsylvania) Emeritus, Drury Coll., Springfield, Mo. *1227 Clay St.* Honorary Life Member

FIRESTONE, C. D., B.S. (New Mexico) Asst., Cornell Univ., Ithaca, N.Y. *White Hall*

FIRST, DOUGLAS. Shipwright, New York Navy Yard, Brooklyn, N.Y. *415 Avenue C*

FISCHER, Asst. Prof. C. H., Ph.D. (Iowa) Univ. of Michigan, Ann Arbor, Mich. *Dept. of Math.*

FISCHER, Asst. Prof. I. C., M.S. (Marquette) Engg., Exten. Div., Univ. of Minnesota, Minneapolis, Minn. *4252 Columbus Ave. S.*

FITE, Prof. W. B., Ph.D. (Cornell) Emeritus, Columbia Univ., New York, N.Y.

FITTERER, Prof. J. C., C.E. (Colorado) Colorado School of Mines, Golden, Colo. *1620 Maple St.*

FITZGERALD, E. L., B.S. (California), A.B. (Gonzaga) Instr., Univ. of Santa Clara, Santa Clara, Calif.

FITZPATRICK, J. D., A.M. (Creighton) Supervisor of Cost Control, Allis Chalmers Mfg. Co., West Allis, Wis. *Lt., U.S.N.R. 2102 W. Wisconsin Ave., Milwaukee, Wis.*

FLAGG, Asst. Prof. ELINOR B., M.S. (Illinois) Illinois State Normal Univ., Normal, Ill. *29 Payne Place*

FLAHERTY, Asst. Prof. W. C., A.B. (Georgetown) Georgetown Univ., Washington, D.C.

FLANDERS, Asso. Prof. D. A., Ph.D. (Pennsylvania) New York Univ., University Heights, New York, N.Y.

FLANDERS, Prof. R. L., M.C.E. (Cornell) Civ. Eng., Oklahoma A. and M. Coll., Stillwater, Okla.

FLECK, Asst. Prof. M. W., M.S. (New Mexico) Biology, Eastern New Mexico Coll., Portales, N.M. *601 S. E. Main St.*

FLEISHER, Asso. Prof. EDWARD, Ph.D. (New York Univ.) Brooklyn Coll., Bedford Ave. and Ave. H, New York, N.Y. *295 St. Johns Place*

FLEMING, Asst. Prof. ANNIE W., A.M. (California) Iowa State Coll., Ames, Iowa. *719 Douglas Ave.*

FLEMING, J. A., D.Sc. (Cincinnati) Dir., Dept. of Terrestrial Magnetism, Carnegie Institution of Washington, 5241 Broad Branch Road N.W., Washington 15, D.C.

FLEXNER, Asso. Prof. W. W., Ph.D. (Princeton) Cornell Univ., Ithaca, N.Y. *White Hall*

FLOGSTAD, IDA, M.S. (Iowa State) Chm. of Dept., State Teachers Coll., Superior, Wis.

FLOOD, M. M., Ph.D. (Princeton) Merrill Flood and Associates, 20 Nassau St., Princeton, N.J. *Tech. Expert, Ordnance Dept., U. S. Army*

FOARD, Prof. C. W., Ph.D. (Iowa) Math. and Physics, Youngstown Coll., Youngstown, Ohio. *Syracuse Univ., Syracuse, N.Y. 417 Maple St., Syracuse 10, N.Y.*

FOBES, Asst. Prof. M. P., A.M. (Harvard) Coll. of Wooster, Wooster, Ohio

FOCKE, Prof. T. M., Ph.D. (Göttingen) Dean, Case School of Appl. Sci., Cleveland, Ohio

FOLLEY, Asso. Prof. K. W., Ph.D. (Toronto) Wayne Univ., Detroit 2, Mich. *19230 Gainsborough St., Detroit 23, Mich.*

FORAKER, Prof. F. A., M.S. (Ohio Northern) Univ. of Pittsburgh, Pittsburgh, Pa. *1313 Macon Ave.*

FORD, CLARENCE, A.M. (Kentucky) Teacher, Boys High School, Louisville, Ky. *125 Cannon's Lane, Louisville 6, Ky.*

FORD, Prof. L. R., Ph.D. (Harvard) Chm. of Dept., Illinois Inst. of Tech., 3300 Federal St., Chicago 16, Ill.

FORD, Prof. W. B., Ph.D. (Harvard) Emeritus, Univ. of Michigan, Ann Arbor, Mich. *Hayt Corners, Seneca Co., N.Y.*

FOREMAN, W. C., A.M. (Kansas) *Lt., U.S.N.R. Route 4, Hannibal, Mo.*

FORMAN, WILLIAM, A.M. (Brooklyn Coll.) Tutor, Brooklyn Coll. Evening Session, Brooklyn, N.Y. *1717 Carroll St.*

FORRAY, M. J., A.B. (New York Univ.) Instr., Washington Square Coll., New York Univ., New York, N.Y. *1329 E. Seventh St., Brooklyn, N.Y.*

FORSYTH, Prof. C. H., Ph.D. (Michigan) Dartmouth Coll., Hanover, N.H.

FORT, Prof. TOMLINSON, Ph.D. (Harvard) Dean, Grad. School, Lehigh Univ., Bethlehem, Pa.

FOSTER, Prof. R. M., B.S. (Harvard) Head of Dept., Poly. Inst. of Brooklyn, Brooklyn, N.Y. *122 E. Dudley Ave., Westfield, N.J.*

FOUST, Prof. J. W., Ph.D. (Michigan) Central Michigan Coll. of Educ., Mt. Pleasant, Mich.

FOX, Asso. Prof. A. H., Ph.D. (Yale) Union Coll., Schenectady, N.Y. *1101 Millington Road*

FRAME, Prof. J. S., Ph.D. (Harvard) Head of Dept., Michigan State Coll., East Lansing, Mich. *222 W. Saginaw St.*

FRANCIS, S. A., A.M. (California) Lecturer, Stanford Univ., Stanford University, Calif. *181 Iris Way, Palo Alto, Calif.*

FRANK, F. T., A.B. (Stanford) Ins. Broker, Parrott and Co., San Francisco, Calif. *708 Ashbury St., San Francisco 17, Calif.*

FRANKEL, E. T., B.S. (C.C.N.Y.) Budget Analyst, Federation of Social Agencies, 519 Smithfield St., Pittsburgh 22, Pa.

FRANKENBUSH, BERTHA E., A.M. (Tulane) Teacher, High School, Retired, New Orleans, La. *5352 Coliseum St., New Orleans 15, La.*

FRANKLIN, Prof. PHILIP, Ph.D. (Princeton) Massachusetts Inst. of Tech., Cambridge, Mass. *312 Pleasant St., Belmont, Mass.*

FRASER, W. A., Ph.D. (Iowa State) Physicist, in charge, Glass Research, Bausch and Lomb Optical Co., Rochester, N.Y.

FREAS, ELIZABETH, A.M. (Louisiana State) Asst., Louisiana State Univ., University Sta., Baton Rouge, La. *Dept. of Math.*

FREESE, FRANCES, A.M. (Southern Methodist), A.M. (Radcliffe) Instr., Cornell Coll., Mt. Vernon, Iowa

FRICK, Prof. C. H., Ph.D. (North Carolina) Mary Washington Coll., Fredericksburg, Va. *Lt. (j.g.), U.S.N.R. One Reid Court, Fredericksburg, Va.*

FRINK, Prof. ORRIN, Jr., Ph.D. (Columbia) Pennsylvania State Coll., State College, Pa. *706 Sunset Road*

FRY, THORNTON C., Ph.D. (Wisconsin) Mathematical Research Dir., Bell Telephone Labs., 463 West St., New York 14, N.Y.

FRY, W. J., M.S. (Pennsylvania State) Asst. Physicist, Naval Research Lab., Washington, D.C.

FUDGE, HELEN G., Ph.D. (Pennsylvania) Teacher, Holmes Jr. High School, Philadelphia, Pa. *Rosemont, Pa.*

FULLER, Prof. GORDON, Ph.D. (Michigan) Alabama Poly. Inst., Auburn, Ala. *346 Payne St.*

FULLER, GRACE A., A.B. (Fresno State Coll.) Head of Dept., Union High School, Madera, Calif.

FULLER, Asso. Prof. K. G., A.M. (Nebraska) Teachers Coll. of Connecticut, New Britain, Conn. *Capt., A.U.S., U.S. Military Acad., West Point, N.Y. Dept. of Math.*

FULMER, Asso. Prof. H. K., A.M. (Columbia) Georgia School of Tech., Atlanta, Ga.

FUNKHOUSER, H. G., Ph.D. (Columbia) Instr., Phillips Exeter Acad., Exeter, N.H. *Cilley Hall*

FURMAN, ALBERT, M.S. (New Hampshire) *Capt., Inf. 221 N. Smith St., Aurora, Ill.*

GABA, Prof. M. G., Ph.D. (Chicago) Univ. of Nebraska, Lincoln, Nebr.

GABRIELLE MARIE, Sister, M.S. (Catholic Univ.) Instr., Dunbarton Coll., Washington, D.C. *2935 Upton St. N.W.*

GADSKE, R. E., Ph.D. (Northwestern) *In Service*

GAGE, Prof. W. H., M.A. (Univ. of B.C.) Univ. of British Columbia, Vancouver, B.C., Can. *Dept. of Math.*

GAGER, Asso. Prof. W. A., Ph.D. (Peabody) Univ. of Florida, Gainesville, Fla. *Peabody 13*

GAINES, Prof. R. E., A.M. (Furman) Univ. of Richmond, Richmond, Va.

GALBRAITH, Asst. Prof. M. G., M.S. (Rutgers) Rutgers Univ., New Brunswick, N.J. *121 Magnolia St.*

GALE, Prof. A. S., Ph.D. (Yale) Dean Emeritus of Phys. Sciences, Univ. of Rochester, Rochester, N.Y. *93 Bellevue Drive*

GARABEDIAN, Prof. C. A., Ph.D. (Harvard) Wheaton Coll., Norton, Mass.

GARDNER, R. W., A.M. (Boston Univ.), D.D. (Olivet Coll.) *Army Chaplain, 1st Lt., 38th Infantry Training Battalion, Camp Croft, S.C. 1339 Emerson Ave., Salt Lake City, Utah*

GARNER, Asst. Prof. L. L., A.M. (North Carolina) Univ. of North Carolina, Chapel Hill, N.C. *207 North St.*

GARRETT, E. T., A.B. (Cornell Coll.) *In Service*

GARRETT, Prof. J. A., A.M. (Peabody) Arkansas A. and M. Coll., Monticello, Ark.

GARRETT, Prof. W. H., A.M. (Illinois Coll.) Vice President, Baker Univ., Baldwin, Kans. *822 Jersey St.*

GARRISON, Asst. Prof. L. M., A.M. (Missouri), Ed.M. (Peabody) Louisiana Poly. Inst., Ruston, La. *Dept. of Math.*

GARVIN, Sister MARY CLEOPHAS, Ph.D. (St. Louis Univ.) Head of Dept. of Sci., Notre Dame Coll., Cleveland 21, Ohio

GASKELL, R. E., Ph.D. (Michigan) Research Asso., Brown Univ., Providence, R.I. *15 Everett Ave.*

GASS, Asso. Prof. C. B., A.M. (Nebraska) Nebraska Wesleyan Univ., Lincoln, Nebr.

GATEWOOD, B. E., Ph.D. (Wisconsin) Stress Engr., McDonnell Aircraft Corp., St. Louis, Mo. *9038 McNulty Drive, St. Louis 21, Mo.*

GAULT, Prof. A. E., M.S. (Chicago) Dean, Arts and Sci., Bradley Poly. Inst., Peoria, Ill.

GAUTHIER, Asst. Prof. ABEL, A.M. (Columbia) Univ. of Montreal, Montreal, P.Q., Can. *Dept. of Math.*

GAVER, H. H., A.M. (Virginia) Headmaster, Black-Foxe Milit. Inst., 637 N. Wilcox Ave., Los Angeles, Calif.

GAVER, Prof. W. H., A.B. (Randolph-Macon) Newberry Coll., Newberry, S.C. *Box 345*

GAY, Prof. H. J., A.M. (Clark) Worcester Poly. Inst., Worcester, Mass. *7 Belvidere Ave., Worcester 5, Mass.*

GAYLORD, Asst. Prof. LESLIE J., M.S. (Chicago) Agnes Scott Coll., Decatur, Ga.

GEHMAN, Prof. H. M., Ph.D. (Pennsylvania) Univ. of Buffalo, Buffalo 14, N.Y. *163 Winspear Ave., Buffalo 15, N.Y.*

GENTRY, Asst. Prof. F. C., Ph.D. (Illinois) Univ. of New Mexico, Albuquerque, N.M. *412 N. Solano St.*

GENTZLER, W. E., A.M. (Columbia) Bursar, Columbia Univ., New York 27, N.Y.

GEORGES, J. S., Ph.D. (Chicago) Chm. of Dept., Wright Jr. Coll., Chicago, Ill. *4515 N. Kildare Ave.*

GERE, B. H., Ph.D. (Mass. Inst. of Tech.) *Lt., U.S.N.R., Instr., Postgrad. School, U.S. Naval Acad., Annapolis, Md.*

GERGEN, Prof. J. J., Ph.D. (Rice) Duke Univ., Durham, N.C. *Box 4771 Duke Sta.*

GERST, Rev. F. J., Ph.D. (Johns Hopkins) Prof., Chm. of Dept., Loyola Univ., 6525 Sheridan Road, Chicago 26, Ill.

GERST, IRVING, A.M. (Columbia) *Asst. Instr., Army Air Force Tech. Training Command, Biloxi, Miss. 412 E. Howard Ave.*
GETCHELL, Asst. Prof. B. C., Ph.D. (Michigan) Butler Univ., Indianapolis, Ind. *903 N. Wayne St., Apt. 305, Arlington, Va.*
GIBBENS, Asst. Prof. GLADYS, Ph.D. (Chicago) Univ. of Minnesota, Minneapolis, Minn. *122 Folwell Hall*
GIBSON, Prof. J. L., Ph.D. (Vienna) Emeritus, Univ. of Utah, Salt Lake City, Utah. *1337 Harrison Ave.*
GILL, Prof. B. P., Ph.D. (Columbia) Coll. of the City of New York, New York, N.Y. *493 Warwick Ave., West Englewood, N.J.*
GILLESPIE, Prof. WILLIAM, Ph.D. (Chicago) Emeritus, Princeton Univ., Princeton, N.J. *Fine Hall*
GILLETTE, E. F., A.B. (Hamilton) Instr., Williams Coll., Williamstown, Mass. *13 Thomas St.*
GILLEY, C. A., A.M. (Texas) Sul Ross State Teachers Coll., Alpine, Tex.
GILLIS, M. E., A.M. (Chicago) Instr., Univ. of Tennessee, Knoxville, Tenn.
GILMAN, Asso. Prof. R. E., Ph.D. (Princeton) Brown Univ., Providence, R.I. *44 E. Manning St.*
GINGRICH, Prof. C. H., Ph.D. (Chicago) Math. and Astr., Carleton Coll., Northfield, Minn. *Goodsell Observatory*
GINNINGS, R. M., M.S. (Chicago) Head of Dept., Emeritus, Western Illinois State Teachers Coll., Macomb, Ill. *314 N. Ward St.*
GINSBURG, A. M., A.M. (Columbia) Asst., Bronx Voc. High School, New York, N.Y. *1563 Metropolitan Ave., New York 62, N.Y.*
GINSBURG, Prof. JEKUTHIEL, A.M. (Columbia) Head of Dept., Yeshiva Coll., New York, N.Y. *610 West 139 St.*
GIVENS, Asst. Prof. J. W., Jr., Ph.D. (Princeton) Northwestern Univ., Evanston, Ill. *Dept. of Math.*
GLAZIER, Asst. Prof. HARRIET E., A.M. (Chicago) Emeritus, Univ. of California at Los Angeles, Los Angeles, Calif. *1307 Lucile Ave., Los Angeles 26, Calif.*
GLENN, W. H., Jr., A.M. (U.C.L.A.) Instr., Pasadena Jr. Coll., Pasadena, Calif. *1425 Beech St., South Pasadena, Calif.*
GLOVER, Prof. B. C., A.M. (Chicago) Otterbein Coll., Westerville, Ohio. *220 Hiawatha Ave.*
GODFREY, E. L., A.M. (Indiana) Instr., Fenn Coll., Cleveland, Ohio. *4434 Ardmore Road, South Euclid 21, Ohio*
GOINS, Asso. Prof. MARY A., A.M. (Michigan) Western Coll., Oxford, Ohio
GOLD, Asso. Prof. J. S., A.M. (Bucknell) Bucknell Univ., Lewisburg, Pa. *306 S. Third St.*
GOLDBERG, MICHAEL, A.M. (George Washington) Principal Ordnance Engr., Bureau of Ordnance, Navy Dept., Washington, D.C. *5823 Potomac Ave. N.W.*
GOLDMAN, Prof. JULIUS, B.S., A.B. (Detroit Inst. of Tech.) Detroit Inst. of Tech., 2020 Witherell St., Detroit, Mich.
GOLDSTINE, H. H., Ph.D. (Chicago) Instr., Univ. of Michigan, Ann Arbor, Mich. *Capt., Ordnance Dept., Ballistic Res. Lab., Aberdeen Proving Ground. 4038 Walnut St., Philadelphia, Pa.*
GOLOMB, MICHAEL, Ph.D. (Berlin) Instr., Purdue Univ., West Lafayette, Ind. *Dept. of Math.*
GONZÁLES, Prof. M. O., D.P.M.S. (Havana) Univ. of Havana, Havana, Cuba. *Escuela de Ciencias*
GOOD, J. M., M.S. (Brown) *Lt. (j.g.), U.S.N.R. 816 South St., Key West, Fla.*
GOODE, C. J., A.B. (Fordham) *In Service*
GOODPASTURE, R. A., B.S. (Colorado State Coll.) Asst. Engr., U.S. Bureau of Reclamation, Custom House, Denver, Colo. *Capt., 157th Inf.*
GOODRICH, M. T., A.M. (Clark Univ.) Head of Dept., Keene Teachers Coll., Keene, N.H. *Instr., Civil Aeronautics Training Program. Navy Barracks, Keene, N.H.*
GORDON, Asso. Prof. W. O., A.M. (Pennsylvania State) Pennsylvania State Coll., State College, Pa. *Dept. of Math.*
GORE, Prof. G. D., Ph.D. (Chicago) Chm. of Dept., Central Y.M.C.A. Coll., 19 S. LaSalle St., Chicago, Ill. *Teaching in war training program, Northwestern Univ.*
GORMAN, J. R., A.M. (U.C.L.A.) Instr., Compton Jr. Coll., Compton, Calif. *Lt. (j.g.), U.S.N.R.*
GORRELL, Prof. G. W., A.M. (Ohio State) Emeritus, Univ. of Denver, Denver, Colo. *Teaching in war training program, Univ. of Denver. Estes Park, Colo.*
GOUGH, Prof. E. S. J., B.A., B.Ed. (Montreal) Math. and Sci., Jacques Cartier Normal School, Montreal, P.Q., Can. *1211 Sherbrooke St. E.*
GOULD, ALICE B., A.B. (Bryn Mawr) 35 Congress St., Boston, Mass.

GOUWENS, Asso. Prof. CORNELIUS, Ph.D. (Chicago) Iowa State Coll., Ames, Iowa. *Dept. of Math.*
GOVE, H. E., M.S. (Washington Univ.) *Major, F. A., U.S. Army. 1736 G Street N.W., Washington, D.C.*
GRABBE, Rev. HYACINTH, A.M. (Catholic Univ.) Prof., St. Joseph's Coll. and Milit. Acad., Hays, Kans.
GRAESSER, Prof. R. F., Ph.D. (Illinois) Univ. of Arizona, Tucson, Ariz. *1648 E. Fifth St.*
GRAHAM, Asst. Prof. MARIA D., A.M. (Columbia) East Carolina Teachers Coll., Greenville, N.C.
GRAHAM, P. H., A.M. (Virginia) Asso. Dean, Chm. of Dept., New York Univ., Washington Square Coll., Washington Square E., New York, N.Y.
GRANT, ALICE A., A.M. (Brown) Apt. 241, 215 College St., Toronto, Ont., Can.
GRANT, Asst. Prof. H. S., Ph.D. (Pennsylvania) Rutgers Univ., New Brunswick, N.J. *Dept. of Math.*
GRAVATT, Prof. T. E., M.S. (Rutgers) Pennsylvania State Coll., State College, Pa. *344 E. College Ave.*
GRAVES, Asst. Prof. C. H., Ph.D. (Chicago) Pennsylvania State Coll., State College, Pa. *Fuel Rationing Division, O.P.A. 700 N. Wayne St., Arlington, Va.*
GRAVES, Asso. Prof. G. H., Ph.D. (Columbia) Purdue Univ., W. LaFayette, Ind. *227 S. Grant St.*
GRAVES, Prof. L. M., Ph.D. (Chicago) Univ. of Chicago, Chicago 37, Ill.
GRAVES, Asst. Prof. W. L., A.M. (Pennsylvania) Drury Coll., Springfield, Mo.
GRAY, MARION C., Ph.D. (Bryn Mawr) Tech. Research, Bell Telephone Labs., 463 West St., New York 14, N.Y.
GRAY, Mrs. MARY W., A.M. (Connecticut Coll.) Instr., Barnard School for Girls, New York, N.Y. *168 Bungalow Ave., Fairfield, Conn.*
GREEN, J. W., Ph.D. (California) Mathematician, Ballistic Research Lab., Aberdeen Proving Ground, Md.
GREEN, L. J., Ph.D. (Chicago) Instr., Case School of Appl. Sci., Cleveland, Ohio
GREENLEAF, Prof. H. E. H., Ph.D. (Indiana) DePauw Univ., Greencastle, Ind. *1024 S. College Ave.*
GREENWOOD, J. A., Ph.D. (Missouri) *Lt., U.S.N.R., Bureau of Aeronautics, Navy Dept. BuAer 2W 89, Washington, D.C.*
GREENWOOD, R. E., Jr., Ph.D. (Princeton) Instr., Univ. of Texas, Austin, Tex. *Lt. (j.g.), U.S.N.R. 1374 Harvard St. N.W., Washington 9, D.C.*
GREER, EDISON, M.S. (Kansas State Coll.) Instr., Educ., Beech Aircraft Corp., Wichita, Kans. *1741 N. Green Ave.*
GREGORY, Asso. Prof. C. D., A.M. (Yale) Coll. of William and Mary, Williamsburg, Va.
GREVILLE, T. N. E., Ph.D. (Michigan) Actuarial Mathematician, Bureau of the Census, Washington, D.C. *1714–34th St. N.W.*
GRIFFIN, Prof. F. L., Ph.D. (Chicago) Reed Coll., Portland 2, Ore.
GRIFFIN, Asst. Prof. HARRIET M., Ph.D. (New York Univ.) Brooklyn Coll., Brooklyn, N.Y. *1575 Brooklyn Ave., Brooklyn 10, N.Y.*
GRIFFIN, J. I., Ph.D. (Columbia) Instr., Econ. and Stat., Coll. of the City of New York, New York, N.Y. *Lecturer, Long Island Univ. 115 Henry St., Brooklyn, N.Y.*
GROVE, Asst. Prof. C. C., Ph.D. (Johns Hopkins) Coll. of the City of New York, New York 10, N.Y. *143 Milburn Ave., Baldwin, N.Y.*
GROVE, Prof. V. G., Ph.D. (Chicago) Michigan State Coll., East Lansing, Mich. *438 Rosewood Ave.*
GROVES, MARJORIE J., A.M. (Chicago) Librarian, Eckhart Library, Univ. of Chicago, Chicago, Ill. *5532 Kenwood Ave.*
GUARD, H. T., M.S. (Colorado) Instr., Colorado State Coll. of A. and M. A., Fort Collins, Colo. *2nd Lt., A.A.F., U.S. Military Acad., West Point, N.Y. Dept. of Math.*
GUNDER, Asso. Prof. D. F., Ph.D. (Wisconsin) Civil Engg., Colorado State Coll. of A. and M.A., Fort Collins, Colo. *College representative for ASTP.*
GUNDERSON, N. G., A.M. (Cornell) Grad. Asst., Cornell Univ., Ithaca, N.Y. *White Hall*

HAAG, V. H., A.M. (Duke) Instr., Hershey Jr. Coll., Hershey, Pa. *204-B W. Granada Ave.*
HACKER, Asst. Prof. S. G., Ph.D. (Princeton) State Coll. of Washington, Pullman, Wash. *Dept. of Math.*
HADLEY, J. R., B.S. (Ohio State) Auditor, Montgomery Ward & Co., Portland, Ore. *831 N.W. 24th St.*
HADLEY, Prof. LAURENCE, Ph.D. (Michigan) Purdue Univ., West LaFayette, Ind. *Box 482*
HADLEY, LENA C. (Mrs. A. J.), A.M. (Missouri) Instr., Central Coll., Fayette, Mo. *500 N. Church St.*
HADLOCK, Asso. Prof. E. H., Ph.D. (Cornell) Hastings Coll., Hastings, Nebr.

HAGEN, Asst. Prof. BEATRICE L., Ph.D. (Chicago) Pennsylvania State Coll., State College, Pa. *126 E. Nittany Ave.*
HAILPERIN, THEODORE, Ph.D. (Cornell) Instr., Cornell Univ., Ithaca, N.Y. *White Hall*
HAIR, Prof. C. L., A.M. (Duke) The Citadel, Charleston, S.C.
HALL, Asst. Prof. D. W., Ph.D. (Virginia) Univ. of Maryland, College Park, Md. *Box 162*
HALL, Prof. H. L., A.M. (Indiana) Head of Dept., Northwestern State Coll., Alva, Okla. *714½ Normal St.*
HALL, N. A., Ph.D. (Calif. Inst. of Tech.) Aero. Engr., Chance Vought Aircraft, Stratford, Conn.
HALLER, Asst. Prof. MARY E., Ph.D. (Washington) Univ. of Washington, Seattle 5, Wash. *Phil. 143D*
HALLERBERG, A. E., A.M. (Illinois) Instr., Illinois Coll., Jacksonville, Ill. *845 S. East St.*
HALLETT, W. N., Ph.D. (Pennsylvania) Instr., State Teachers Coll., Frostburg, Md. *2nd Lt., A.G.D. 202 Herman Ave., Lemoyne, Pa.*
HALMOS, Asst. Prof. P. R., Ph.D. (Illinois) Syracuse Univ., Syracuse, N.Y. *513 Fellows Ave., Syracuse 10, N.Y.*
HAMILTON, O. H., Ph.D. (Texas) *In Service*
HAMILTON, W. M., A.M. (Michigan) Asst., U.S. Nautical Almanac Office, U.S. Naval Observatory, Washington, D.C.
HAMMER, P. C., Ph.D. (Ohio State) Instr., Oregon State Coll., Corvallis, Ore. *R.R. 1*
HAMMING, R. W., Ph.D. (Illinois) Instr., Univ. of Illinois, Urbana, Ill. *359 Math. Bldg.*
HAMMOND, Prof. E. S., Ph.D. (Princeton) Bowdoin Coll., Brunswick, Me.
HANCOCK, CLARA L., A.M. (Iowa) Instr., Junior Coll., Virginia, Minn. *Box 706*
HANCOCK, Prof. HARRIS, Ph.D. (Berlin) Emeritus, Univ. of Cincinnati, Cincinnati, Ohio. *Box 1302 Univ. Station, Charlottesville, Va.*
HAND, Sister MIRIAM, A.B. (Immaculate Heart) Instr., Immaculate Heart Coll., *2021 N. Western Ave., Hollywood, Calif.*
HANNA, J. R., M.S. (Kans. St. T. C., Emporia) Instr., Univ. of Wichita, Wichita, Kans.
HANSON, E. H., Ph.D. (Ohio State) Chm. of Dept., North Texas State Teachers Coll., Denton, Tex. *Lt., U.S.N.R., 3864 Porter St. N.W., Apt. B 362, Washington, D.C.*
HARDIN, J. A., A.M. (Chicago) Dean of Men, Centenary Coll., Shreveport 16, La.
HARDING, Pres. A. M., Ph.D. (Chicago) Univ. of Arkansas, Fayetteville, Ark. *403 Washington St.*
HARDING, HOWARD, B.M.E. (Michigan) Rochester Gas and Elec. Corp., Rochester, N.Y. *29 Kingston St.*
HARDMAN, W. R., A.B. (Indiana) Instr., Purdue Univ., W. LaFayette, Ind. *103 Waldron St.*
HARDY, Prof. G. H., M.A. (Trinity, Cambridge) Trinity Coll., Cambridge Univ., Cambridge, England
HARKIN, D. C., Ph.D. (Chicago) Instr., Brooklyn Coll., Brooklyn, N.Y. *Research Div., Bureau of Ordnance, Navy Dept., Washington, D.C. 3000 Crest Ave., Cheverly, Md.*
HARMAN, H. H., M.S. (Chicago) Chief Statistician, Dept. of Public Welfare, Springfield, Ill. *801 S. English St.*
HARMON, ELIZABETH HARRIS (Mrs. J. P.), M.S. (Washington Univ.) 2018½ N. Mitchell St., Phoenix, Ariz.
HARP, E. L., Jr., A.M. (New Mexico) Head of Dept., High School, Roswell, N.M. *805 W. Mathews St.*
HARPER, Asst. Prof. F. S., Ph.D. (Iowa) Univ. of Nebraska, Lincoln, Nebr. *307-D M.A. Hall*
HARRELL, E. G., Ph.D. (Iowa) Head of Dept., State Teachers Coll., Platteville, Wis. *414 S. Chestnut St.*
HARRINGTON, C. E., M.S. (Buffalo) Sr. Project Engr., Paragon Research, Inc., Buffalo, N.Y. *52 Winter St.*
HARRINGTON, W. J., Ph.D. (Cornell) Instr., Pennsylvania State Coll., State College, Pa. *Dept. of Math.*
HARRIS, Asso. Prof. ISABEL, A.M. (Columbia) Westhampton Coll., Univ. of Richmond, Richmond, Va.
HARRIS, MINNIE W. C. (Mrs. D. P.), A.M. (Missouri) Teacher, Math. and Physics, Campbell Coll., Buie's Creek, N.C. *1203 Filmore St., Raleigh, N.C.*
HARRISON, R. A., Ph.D. (Cornell) Instr., St. Mark's School, Southborough, Mass.
HARSHBARGER, Asso. Prof. FRANCES, Ph.D. (Illinois) Kent State Univ., Kent, Ohio
HART, BERTHA I., A.M. (Cornell) Chief Computer, Ballistic Research Lab., Aberdeen Proving Ground, Md.
HART, Prof. W. L., Ph.D. (Chicago) Univ. of Minnesota, Minneapolis, Minn.
HART, Asso. Prof. W. W., A.B. (Chicago) Retired, Univ. of Wisconsin. *139 Tudor Pl., Kenilworth, Ill.*

HARTIG, Prof. H. E., Ph.D. (Minnesota) Communication Engg., Univ. of Minnesota, Minneapolis, Minn. *Asst. Director, Univ. of California Div. of War Research. U.S. Navy Radio and Sound Lab., San Diego, Calif.*

HARTLEY, Asst. Prof. M. C., Ph.D. (Illinois) Univ. of Illinois, Urbana, Ill. *1203 W. Illinois St.*

HARTNELL, GEORGE. Observer in charge, Retired, Magnetic Observ., U.S. Coast and Geodetic Survey, Cheltenham, Md. *Wyoming, N.Y.*

HARTUNG, Asst. Prof. M. L., Ph.D. (Wisconsin) Univ. of Chicago, Chicago 37, Ill. *Grad. Educ. Bldg.*

HARTZLER, Prof. H. H., Ph.D. (Rutgers) Goshen Coll., Goshen, Ind.

HARVEY, Asso. Prof. G. G., Ph.D. (Washington Univ.) Physics, Massachusetts Inst. of Tech., Cambridge 39, Mass.

HARVEY, W. R., M.S. (Michigan) Memb. Tech. Staff, Bell Telephone Labs., New York, N.Y. *1504 Kingsway Road, Baltimore 18, Md.*

HARWOOD, Asst. Prof. MAY N., A.M. (Syracuse) Syracuse Univ., Syracuse, N.Y. *803 Comstock Ave.*

HASKINS, ELIZABETH M., M.S. (Mass. Inst. of Tech.) Massachusetts Inst. of Tech., Cambridge, Mass. *27 Vernon St., Worcester 4, Mass.*

HASSLER, Prof. J. O., Ph.D. (Chicago) Math. and Astr., Univ. of Oklahoma, Norman, Okla. *425 Lahoma Ave.*

HASTINGS, CECIL, Jr., B.S. (Florida) Computer, Franklin Inst., New York, N.Y. *Shelton Hotel 349, Lexington Ave. and 49 St.*

HATCH, Asso. Prof. D. A., A.M. (Columbia) Lafayette Coll., Easton, Pa. *705 High St.*

HATCHER, Prof. T. W., Ph.D. (Cornell) Virginia Poly. Inst., Blacksburg, Va. *Box 476*

HATFIELD, CHARLES, A. M. (Tennessee) Head of Dept., Georgetown Coll., Georgetown, Ky. *301 Clayton Ave.*

HATFIELD, CHARLES, Jr., A.M. (Kentucky) Teaching Fellow, Cornell Univ., Ithaca, N.Y. *White Hall*

HATTAN, CORINNE R., A.M. (Kansas) Asst., Univ. of Illinois, Urbana, Ill. *1110 W. Main St.*

HAUSMANN, Rev. B. A., Ph.D. (Yale) Chm. of Dept., Univ. of Detroit, McNichols Road at Livernois, Detroit, Mich.

HAVILAND, Prof. E. K., Ph.D. (Harvard; Johns Hopkins) Lincoln Univ., Chester Co., Pa. *Box 382, Oxford, Pa.*

HAWTHORNE, FRANK, B.S. in Educ. (Penn. St. T. C., Edinboro) Instr., Math. and Physics, Alliance Coll., Cambridge Springs, Pa. *Instr., Physics, Allegheny Coll., Meadville, Pa. 232 Bolard Ave., Cambridge Springs, Pa.*

HAY, Asst. Prof. G. E., Ph.D. (Toronto) Univ. of Michigan, Ann Arbor, Mich. *Dept. of Math.*

HAYES, J. J., B.S. (Utah) Instr., Univ. of Utah, Salt Lake City, Utah

HAYNES, NOLA L. A. (Mrs. E. S.), Ph.D. (Missouri) Instr., Univ. of Missouri, Columbia, Mo. *1408 Rosemary Lane*

HAZARD, Prof. C. T., A.M. (Indiana) Purdue Univ., West LaFayette, Ind. *344 N. Western Ave.*

HAZELTINE, Prof. B. A., A.M. (Columbia) Middlebury Coll., Middlebury, Vt. *38 South St.*

HAZELTINE, Prof. L. A., M.E. (Stevens), A.M. (Columbia) Physics, Stevens Inst. of Tech., Hoboken, N.J.

HAZLETT, Asso. Prof. OLIVE C., Ph.D. (Chicago) Univ. of Illinois, Urbana, Ill.

HAZLEWOOD, E. A., Ph.D. (Cornell) *Lt., U. S. Military Acad., West Point, N.Y. Dept. of Math.*

H'DOUBLER, F. T., Ph.D. (Wisconsin), M.D. (Harvard) Surgeon, Springfield, Mo. *Medical Arts Bldg.*

HEARN, Rev. J. R., A.M. (Woodstock) St. Ignatius Rectory, Baltimore, Md.

HEASLET, Asso. Prof. M. A., Ph.D. (Stanford) San Jose State Coll., San Jose, Calif. *Asso. Physicist, Dept. of Theoretical Aerodynamics, N.A.C.A., Moffett Field, Calif. Box 402, Los Altos, Calif.*

HEATH, R. V. Member, New York Stock Exchange, New York, N.Y. *40 Wall St.*

HEBEL, Asso. Prof. I. L., M.S. (Colorado) Colorado School of Mines, Golden, Colo.

HEDLUND, Prof. G. A., Ph.D. (Harvard) Univ. of Virginia, Charlottesville, Va. *1834 Fendall Ave.*

HEFNER, Prof. R. A., Ph.D. (Chicago) Georgia School of Tech., Atlanta, Ga.

HEILMAN, Prof. C. E., A. M. (Duke) Math. and Physics, Elizabethtown Coll., Elizabethtown, Pa. *352 N. Tenth St., Lebanon, Pa.*

HEIMANN, Prof. E. E., A.M. (Texas) East Central State Coll., Ada, Okla. *523 S. Highland St.*

HEINEMAN, Asso. Prof. E. R., A.M. (Wisconsin) Texas Tech. Coll., Lubbock, Tex.

HEINS, Asst. Prof. M. H., Ph.D. (Harvard) Illinois Inst. of Tech., 3300 Federal St., Chicago, Ill.

HEINZMAN, Asso. Prof. W. P., M.S. (New Mexico A. and M.A.), A.M. (Illinois) Acting Head of Dept., New Mexico Coll. of A. and M.A., State College, N.M. *Box 144*

HELLINGER, E. D., Ph.D. (Göttingen) Lecturer, Northwestern Univ., Evanston, Ill. *2215 Maple Ave.*

HELLMICH, Asso. Prof. E. W., Ph.D. (Columbia) Northern Illinois State Teachers College, DeKalb, Ill. *Teaching in war training program, Northwestern Univ. 1000 Grove St., Evanston, Ill.*

HELMS, C. B., B.S. in Educ. (Temple) Instr., Antioch Coll., Yellow Springs, Ohio. *320 Livermore St.*

HEMENWAY, Asso. Prof. L. D., A.M. (Harvard) Math. and Physics, Simmons Coll., 300 The Fenway, Boston, Mass.

HENDERSON, Prof. ARCHIBALD, Ph.D. (North Carolina; Chicago) Head of Dept., Univ. of North Carolina, Chapel Hill, N.C. *721 E. Franklin St.*

HENDRIX, Asst. Prof. GERTRUDE, M.S., A.M. (Illinois) Eastern Illinois State Teachers Coll., Charleston, Ill. *1425 Fourth St.*

HENNEL, Prof. CORA B., Ph.D. (Indiana) Indiana Univ., Bloomington, Ind. *410 S. Park Ave.*

HENRIQUES, Asst. Prof. ANNA S. (Mrs. D. E.), Ph.D. (Chicago) Univ. of Utah, Salt Lake City 2, Utah

HEREN, Prof. MABEL M., M.S. (Northwestern) Chm. of Dept., Knox Coll., Galesburg, Ill.

HERPEL, Asst. Prof. COLEMAN, A.M. (Harvard) Pennsylvania State Coll., Undergrad. Center, Hazleton, Pa. *Lt. (j.g.), U.S.N.R. 301 N. Broad St., W. Hazleton, Pa.*

HERR, Asso. Prof. GERTRUDE A., M.S. (Iowa State) Iowa State Coll., Ames, Iowa. *Dept. of Math.*

HESS, Prof. G. W., Ph.D. (Michigan) Head of Dept., Howard Coll., Birmingham, Ala. *8009 Berney Ave.*

HESSE, EMMA V., A.M. (Columbia) Teacher, Public School, Oakland, Calif. *2412 Durant Ave., Berkeley 4, Calif.*

HESSELTINE, EVELYN, A.M. (Nebraska) Teacher, Black Hills Teachers Coll., Spearfish, S.D. *Box 309*

HESTENES, Asst. Prof. M. R., Ph.D. (Chicago) Univ. of Chicago, Chicago, Ill. *Eckhart Hall*

HEYDA, Asst. Prof. J. F., Ph.D. (Illinois) Denison Univ., Granville, Ohio. *Box 576*

HICKERSON, Prof. T. F., A.M. (North Carolina) Univ. of North Carolina, Chapel Hill, N.C. *108 Battle Lane*

HICKMAN, J. S., A.M. (Minnesota) Instr., Rochester Jr. Coll., Rochester, Minn.

HICKSON, Asst. Prof. A. O., Ph.D. (Chicago) Duke Univ., Durham, N.C. *2712 Legion Ave.*

HIGGINS, Asso. Prof. T. J., Ph.D. (Purdue) Elec. Engg., Illinois Inst. of Tech., 3300 Federal St., Chicago, Ill.

HIGHTOWER, Prof. RUBY U., Ph.D. (Missouri) Shorter Coll., Rome, Ga.

HILDEBRANDT, Asst. Prof. E. H. C., Ph.D. (Michigan) Northwestern Univ., Evanston, Ill. *319 Music*

HILDEBRANDT, Prof. T. H., Ph.D. (Chicago) Univ. of Michigan, Ann Arbor, Mich. *1930 Cambridge Road*

HILDNER, Asst. Prof. R. C., Ph.D. (Ohio State) Coll. of Wooster, Wooster, Ohio

HILL, A. L., A.B. (Doane) *Major, 1287 Krameria St., Denver 7, Colo.*

HILL, Asst. Prof. D. M., Ph.D. (Rutgers) Philadelphia Coll. of Phar. and Sci., Philadelphia, Pa.

HILL, Asst. Prof. J. D., Ph.D. (Brown) Michigan State Coll., East Lansing, Mich.

HILL, Asso. Prof. L. S., Ph.D. (Yale) Hunter Coll., New York, N.Y. *22 Sagamore Road, Bronxville 8, N.Y.*

HILL, Prof. M. A., Jr., A.M. (North Carolina) Univ. of North Carolina, Chapel Hill, N.C. *Capt., Quartermaster Corps, 2026 Fort Davis St. S.E., Apt. 202, Washington 20, D.C.*

HILL, Asso. Prof. P. R., M.S. (Georgia) Univ. of Georgia, Athens, Ga. *190 Morton Ave.*

HILLE, Prof. EINAR, Ph.D. (Stockholm) Yale Univ., New Haven, Conn. *125 Armory St., Hamden, Conn.*

HILLS, E. J., Ph.D. (Southern California) Instr., Los Angeles City Coll., Los Angeles, Calif. *4156 Crisp Canyon Road, Sherman Oaks, Calif.*

HINDS, Mrs. FRANCES C., A.M. (U.C.L.A.) Asst. Prof., George Pepperdine Coll., 1121 West 79th St., Los Angeles, Calif.

HLAVATY, J. H., B.S. (C.C.N.Y.) Chm. of Dept., High School of Science, 184 St. and Creston Ave., New York, N.Y.

HOARE, Prof. A. J., A.M. (Michigan) Univ. of Wichita, Wichita, Kans. *1717 N. Holyoke Ave.*

HODGE, Asst. Prof. F. H., A.M. (Boston) Emeritus, Purdue Univ., West LaFayette, Ind. *820 N. Main St.*

HODGES, GERTRUDE B. (Mrs. C. E.), A.M. (Brown) High School, Kenmore, N.Y. *167 Somerton Ave.*

HOEL, Asst. Prof. P. G., Ph.D (Minnesota) Univ. of California at Los Angeles, Los Angeles 24, Calif.
HOHN, F. E., Ph.D. (Illinois) Instr., Univ. of Arizona, Tucson, Ariz.
HOLGATE, Prof. T. F., Ph.D. (Clark) Emeritus, Northwestern Univ., Evanston, Ill. *617 Library Pl.*
HOLLAND, Sister MARY CHARLOTTE, A.M. (Catholic Univ.) Registrar, St. Xavier Coll., 4900 Cottage Grove Ave., Chicago, Ill.
HOLLCROFT, Prof. T. R., Ph.D. (Cornell) Wells Coll., Aurora, N.Y.
HOLMES, Prof. C. T., Ph.D (Harvard) Bowdoin Coll., Brunswick, Me. *60 Spring St.*
HOLT, E. W., M.S. (Chicago) Head of Dept., Lawrence Acad., Groton, Mass. *Lt., U.S.N.R., Naval Acad. Prep. School, U.S. Naval Training Station, Bainbridge, Md.*
HOOK, Asst. Prof. C. W., A.M. (North Carolina) Georgia School of Tech., Atlanta, Ga. *Lt., U.S.N.R., U.S. Naval Acad. 221 Westwood Road, Wardour, Annapolis, Md.*
HOOPES, M. F., A.B. (Oberlin) Teacher, Southern State Normal School, Springfield, S.D.
HOOPS, R. R. Deputy County Surveyor, Perry Co., New Lexington, Ohio. *Box 392*
HOOVER, Asso. Prof. B. P., Ph.D. (Illinois) Carnegie Inst. of Tech., Pittsburgh, Pa. *2040 Fairlawn St., Pittsburgh 21, Pa.*
HOPKINS, FANNIE, A.M. (Wisconsin) Teacher, High School, Waukesha, Wis. *114 West Ave. N.*
HOPKINS, Asso. Prof. L. A., Ph.D. (Chicago) Univ. of Michigan, Ann Arbor, Mich.
HORN, W. J., B.S. Arcbt. (A. and M. Coll. of Texas) Engr., Truscon Steel Co., Houston, Tex. *2113 Eagle St., Houston 4, Tex.*
HORSFALL, I. O., Ph.D. (Cornell) Director, Exten. Div., Univ. of Utah, Salt Lake City 1, Utah. *82 Virginia St., Salt Lake City 3, Utah*
HOUSEHOLDER, Asst. Prof. A. S., Ph.D. (Chicago) Math'l Biophysics, Univ. of Chicago, Chicago, Ill. *5822 Drexel Ave.*
HOVE, E. MARIE, M.S. (Iowa) Instr., State Teachers Coll., Cedar Falls, Iowa. *2304 Olive St.*
HOVEY, B. K., Ph.D. (Göttingen) Instr., Elec. Eng., Univ. of Pittsburgh, Pittsburgh, Pa. *208 Thaw Hall*
HOWARD, Prof. C. M., E. Mines (Alabama Poly. Inst.) Acting Head of Dept., North Texas Agric. Coll., Arlington, Tex. *605 S. Center St.*
HOWARD, HARRIET, A.M. (Boston Univ.) Teacher, The Ethel Walker School, Simsbury, Conn.
HOWE, G. K., B.S. (Worcester Poly. Inst.) Bell Aircraft Corp., Marietta, Ga. *359 Fifth St. N.W., Atlanta, Ga.*
HOWELL, J. V., A.M. (North Carolina) Chm. of Dept., Mars Hill Coll., Mars Hill, N.C. *Lt. (j.g.), U.S.N.R.*
HOWELL, S. W., A.M. (South Dakota) Instr., Math. and Physics, Univ. of South Dakota, Vermillion, S.D.
HOWIE, Prof. J. M., A.M. (Columbia) Emeritus, Nebraska Wesleyan Univ., Lincoln, Nebr. *2650 Dahlia St., Denver 7, Colo.*
HOWLAND, Prof. L. A., Ph.D. (Munich) Dean, Wesleyan Univ., Middletown, Conn.
HOY, Mrs. RUTH YAP, A.M. (Hawaii) 2800 Erie St. S.E., Apt. B-5, Washington 20, D.C.
HUBBARD, J. F., Ed.M. (Teachers Coll. of Boston) Vice Principal, Rogers Intermediate School, Boston, Mass. *476 Beacon St.*
HUBBS, Prof. H. N., Ph.D. (Cornell) Hobart Coll., Geneva, N.Y. *114 Washington St.*
HUBERT, Asso. Prof. W. G., Sc.D. (New York Univ.) Coll. of the City of New York, 139 St. and Convent Ave., New York 31, N.Y.
HUCK, RAYMOND, M.S. (Illinois) *In Service*
HUFF, Asso. Prof. G. B., Ph.D. (Illinois) Southern Methodist Univ., Dallas, Tex.
HUFF, W. N., A.M. (Pennsylvania) Instr., Univ. of Nebraska, Lincoln, Nebr. *4621 South St.*
HUFFER, Prof. R. C., Ph.D. (Chicago) Beloit Coll., Beloit, Wis. *729 Hobart Place*
HUGHES, Asso. Prof. H. K., Ph.D. (Michigan) Purdue Univ. LaFayette, Ind. *Dept. of Math.*
HUGHES, H. M., A.M. (Texas) Jr. Mathematician, Maps and Surveys, Tennessee Valley Authority, Chattanooga, Tenn. *Ensign, U.S.N.R., 800 N. Bridge St., Brady, Tex.*
HULL, RALPH, Ph.D. (Chicago) Chm. of Dept., Univ. of Nebraska, Lincoln, Nebr. *Dept. of Math., 300 M.A. Bldg.*
HUME, ALFRED, D.Sc. (Vanderbilt) Head of Dept., Acting Chancellor, Univ. of Mississippi, University, Miss.
HUMMEL, Asst. Prof. P. M., Ph.D. (Ohio State) Univ. of Alabama, University, Ala. *8 N. Pinehurst St., Tuscaloosa, Ala.*
HUMPHREY, H. K., M.S. in E.E. (Union) Chm. of Board, Winnetka Trust and Savings Bank, Winnetka, Ill. *520 Ash St.*

HUMPHREYS, Asst. Prof. M. GWENETH, Ph.D. (Chicago) Sophie Newcomb Coll., New Orleans 18, La.
HUNT, Asst. Prof. G. H., C.E. (Cornell) Univ. of California at Los Angeles, 405 Hilgard Ave., Los Angeles 24, Calif.
HUNT, Prof. MILDRED, Ph.D. (Chicago) Illinois Wesleyan Univ., Bloomington, Ill. *406 E. Walnut St.*
HUNTER, Asst. Prof. J. L., Ph.D. (Catholic Univ.) John Carroll Univ., Cleveland, Ohio
HUNTER, Mrs. LOUISE S., Ed.M. (Harvard) Asst. Prof., Virginia State Coll., Ettrick, Va.
HUNTINGTON, Prof. E. V., Ph.D. (Strassburg) Emeritus, Mech., Harvard Univ., Cambridge, Mass. *48 Highland St.*
HURRY, Prof. J. A., A.M. (California) Head of Dept., Physics, Junior Coll., San Antonio, Tex.
HURST, Prof. J. W., Ph.D. (Illinois) Montana State Coll., Bozeman, Mont. *522 S. Sixth St.*
HURWITZ, SOLOMON, A.M. (Columbia) Instr., Brooklyn Coll., Brooklyn, N.Y. *4014 Avenue I, Brooklyn 10, N.Y.*
HURWITZ, Prof. W. A., Ph.D. (Göttingen) Cornell Univ., Ithaca, N.Y. *White Hall*
HUTCHERSON, Prof. W. R., Ph.D. (Cornell) Head of Dept., Berea Coll., Berea, Ky.
HUTCHINSON, Prof. C. A., A.M. (Wittenberg) Head of Dept., Eng. Math., Univ. of Colorado, Boulder, Colo.
HUTCHINSON, L. C., Ph.D. (Mass. Inst. of Tech.) Asst. Research Mathematician, N.D.R.C., Columbia Univ., New York, N.Y. *401 West 118 St., New York 27, N.Y.*
HUTCHINSON, Prof. R. O., Ph.D. (Chicago) Tennessee Poly. Inst., Cookeville, Tenn.
HUTCHISON, Asst. Prof. L. P., Ph.D. (Kentucky) The Citadel, Charleston, S.C.
HYDE, Asso. Prof. EMMA, A.M. (Chicago) Kansas State Coll., Manhattan, Kans.
HYDEN, Prof. J. A., Ph.D. (Cornell) Vanderbilt Univ., Nashville, Tenn. *Dept. of Math.*
HYERS, D. H., Ph.D. (Calif. Inst. of Tech.) Research Fellow, Mech. Engg., California Inst. of Tech., Pasadena, Calif. *101 N. Hill Ave., Pasadena 4, Calif.*

IKENBERRY, Asst. Prof. J. E., Ph.D. (Cornell) Franklin and Marshall Coll., Lancaster, Pa.
INGALLS, Asst. Prof. E. E., Ph.D. (Michigan) Albion Coll., Albion, Mich. *1111 Michigan Ave.*
INGRAHAM, M. H., Ph.D. (Chicago) Dean, Coll. of Letters and Science, Univ. of Wisconsin, Madison, Wis. *South Hall*
INNIS, MARY E., A.M. (Smith) Teacher, Westover School, Middlebury, Conn.
IRR, E. J. 3064 Lincoln Blvd., Cleveland Heights, Ohio
IVANOFF, V. F., A.M. (California) 777 Seventh Ave., San Francisco, Calif.
IYENGAR, Prof. K. S. K., B.A. (Cantab.) Central Coll., Bangalore, India

JABLONOWER, JOSEPH, Pd.M. (New York Univ.) Memb. Board of Examiners of the City of New York, New York, N.Y. *110 Livingston St., Brooklyn, N.Y.*
JACKSON, Prof. DUNHAM, Ph.D. (Göttingen) Univ. of Minnesota, Minneapolis, Minn. *119 Folwell Hall*
JACKSON, H. B., A.B. (Harvard) Head of Dept., Belmont Hill School, Belmont, Mass. *56 Smith Road, Milton, Mass.*
JACKSON, Prof. J. B., A.M. (Columbia) Univ. of South Carolina, Columbia, S.C. *227 S. Waccamaw Ave.*
JACKSON, Prof. ROSA L., Ph.D. (Chicago) Head of Dept., Alabama Coll., Montevallo, Ala. *211 Moody St.*
JACKSON, T. W., A.M. (Missouri) Head of Dept., Jamestown Coll., Jamestown, N.D. *729 Fifth St. N.E.*
JACOBSON, N. L., B.S. in Educ. (Oregon) Instr., Central Missouri State Teachers Coll., Warrensburg, Mo. *324 Anderson*
JAEGER, Prof. C. G., Ph.D. (Missouri) Chm. of Dept., Pomona Coll., Claremont, Calif. *1045 Yale Ave.*
JAMES, Asso. Prof. GLENN, Ph.D. (Columbia) Univ. of California at Los Angeles, Los Angeles, Calif.
JAMES, Prof. R. D., Ph.D. (Chicago) Univ. of British Columbia, Vancouver, B.C., Can. *Dept. of Math.*
JAMISON, FREE, Ph.D. (Pittsburgh) Teacher, Public Schools; Lecturer, Univ. of Pittsburgh, Pittsburgh, Pa. *Lt., U.S.N.R., U.S. Naval Pre-Flight School, Athens, Ga.*
JAMISON, G. H., A.M. (Chicago) Head of Dept., State Teachers Coll., Kirksville, Mo.
JANES, Asst. Prof. W. C., A.M. (Nebraska) Kansas State Coll., Manhattan, Kans. *1115 Thurston St.*
JASON, Prof. W. B., A.M. (Pennsylvania) Dean, Lincoln Univ., Jefferson City, Mo.
JAUTZ, M. L., A.B. (Marquette) Student, St. Francis Major Seminary, St. Francis, Wis. *1933 N. 24th St., Milwaukee, Wis.*

JEFFERY, Prof. R. L., Ph.D. (Cornell) Queen's Univ., Kingston, Ont., Can. *Dept. of Math.*
JENKINS, Asso. Prof. E. D., Ph.D. (Ohio State) Eastern Kentucky State Teachers Coll., Richmond, Ky. *Lt. (j.g.), U.S.N.R. 1405 Howard Ave., Utica, N.Y.*
JENSEN, C. M., Ph.D. (Minnesota) Instr., Univ. of Minnesota, Minneapolis, Minn. *3315-17th Ave. S.*
JERBERT, Asso. Prof. A. R., Ph.D. (Washington) Univ. of Washington, Seattle, Wash.
JOFFE, S. A., M.S. (New York Univ.) Actuary, Retired, Mutual Life Ins. Co., New York, N.Y. *515 West 110 St., New York 25, N.Y.*
JOHANSON, Asst. Prof. R. N., Ph.D. (Chicago) Hamilton Coll., Clinton, N.Y. *College Hill*
JOHN, Asso. Prof. FRITZ, Ph.D. (Göttingen) Univ. of Kentucky, Lexington, Ky. *Asso. Mathematician, Ballistic Research Lab., Aberdeen Proving Ground, Md.*
JOHN, Asso. Prof. F. W., M.E. (Cornell) Washington Square Coll., New York Univ., New York, N.Y.
JOHNSON, Prof. A. FRANCES, Ph.D. (Minnesota) Math. and Physics, Rockford Coll., Rockford, Ill.
JOHNSON, D. F., M.S. (Middlebury) Instr., Math. and Chem., Mercersburg Acad., Mercersburg, Pa.
JOHNSON, ED. A. Asst. Engr., U.S. Dept. of Engineering, Phoenix, Ariz. *1743 W. Monroe St.*
JOHNSON, Asso. Prof. EVAN, Jr., Ph.D. (Chicago) Pennsylvania State Coll., State College, Pa. *345 S. Buckhout St.*
JOHNSON, E. H., Ph.D. (Michigan) Research Div., O.P.A., Washington, D.C. *3939 Pennsylvania Ave. S.E., Apt. 202*
JOHNSON, L. G., A.M. (Michigan) Grad. Asst., Univ. of Michigan, Ann Arbor, Mich. *509 S. Division*
JOHNSON, O. H., M.S. (Iowa) Radio Engr., Signal Corps, War Dept., Dayton, Ohio. *826 W. Fifth St.*
JOHNSON, Prof. R. A., Ph.D. (Harvard) Brooklyn Coll., Bedford Ave. and Ave. H, Brooklyn, N.Y.
JOHNSON, Asso. Prof. R. P., Ph.D. (Pittsburgh) Carnegie Inst. of Tech., Pittsburgh, Pa.
JOHNSON, W. W. Instr., Huntington Poly. Inst., Cleveland, Ohio. *10722 Orville Ave.*
JOHNSTON, ERNEST, M.S. (Illinois) Instr., Math. and Mech., Univ. of Minnesota, Minneapolis, Minn. *1630 Adams St. N.E.*
JOHNSTON, Prof. F. E., Ph.D. (Illinois) George Washington Univ., Washington, D.C.
JOHNSTON, Prof. L. S., A.M. (Missouri) Univ. of Detroit, Detroit, Mich. *227 Engineering Bldg.*
JOLIAT, Prof. J. S., M.S. (St. Louis Univ.) John Carroll Univ., Cleveland Heights, Ohio
JONAH, F. C., Ph.D. (Brown) Engr., Chance Vought Aircraft, Stratford, Conn. *119 W. Fifth Ave., Laurel Beach, Milford, Conn.*
JONES, Asso. Prof. B. W., Ph.D. (Chicago) Cornell Univ., Ithaca, N.Y. *White Hall*
JONES, Prof. E. F. W., C.E. (Manhattan Coll.) Rollins Coll., Winter Park, Fla.
JONES, Prof. HARRIS, B.S. (Mass. Inst. of Tech.) Col., U.S. Army, U.S. Military Acad., West Point, N.Y.
JONES, MARGARET E., A.M. (Ohio State) Instr., Ohio State Univ., Columbus, Ohio. *164-13th Ave.*
JONES, Prof. OLIVE M., A.M. (Columbia) Head of Dept., Queens Coll., Charlotte, N.C.
JONES, P. C., B.S. (Mass. Inst. of Tech.) Tech. Editor, Bell Telephone Labs., 463 West St., New York, N.Y. *Room 1103*
JONES, PHILLIP S., A.M. (Michigan) Instr., Edison Inst. of Tech., Dearborn, Mich. *Instr., Univ. of Michigan, Ann Arbor, Mich. 315 W. Engineering Bldg.*
JONES, Asst. Prof. R. W., M.S. (Delaware), A.M. (Pennsylvania) Engg., Univ. of Delaware, Newark, Del. *121 Townsend Road*
JORDAN, Asso. Prof. H. E., Ph.D. (Chicago) Univ. of Kansas, Lawrence, Kans. *1600 Kentucky St.*
JORDAN, H. J. *Master Sergeant, Weather Forecaster, Army Air Forces. 118-20th Ave. S., Nashville 4, Tenn.*
JURDAK, Prof. M. H., M.A. (Amer. Univ. of Beirut) American Univ. of Beirut, Beirut, Syria
JUSTICE, Prof. H. K., Ph.D. (Cincinnati) Coll. of Eng. and Commerce, Univ. of Cincinnati, Cincinnati, Ohio. *927 Kreis Lane*
JUSTIN, Asst. Prof. E. M., M.S. (Case School) Case School of Appl. Sci., Cleveland, Ohio. *Instr., Univ. of California at Los Angeles. 17138 Ventura Blvd., Encino, Calif.*

KAC, Asst. Prof. MARK, Ph.D. (John Casimir Univ., Lwow) Cornell Univ., Ithaca, N.Y. *White Hall*
KAELIN, G. R., A.M. (California) Instr., Los Angeles City Coll., 855 N. Vermont Ave., Los Angeles, Calif.
KALISCH, G. K., Ph.D. (Chicago) Instr., Univ. of Kansas, Lawrence, Kans. *Dept. of Math.*

KALISH, AIDA, A.M. (Columbia) 420 Crown St., Brooklyn, N.Y.
KALLFELZ, L. N., B.S. (Syracuse) *Lt. (j.g.), U.S.N.R., Navy Dept., Washington, D.C. 1905 G Street N.W.*
KALTENBORN, Asso. Prof. H. S., Ph.D. (Michigan) Louisiana Poly. Inst., Ruston, La. *915 Simsboro Road*
KAPLAN, E. L., B.S. (Carnegie Inst. of Tech.) Asst. Physicist, Naval Ordnance Lab., Navy Yard, Washington, D.C. *7929 Riverview Ave., Swissvale, Pa.*
KAPLAN, SIDNEY, A.M. (Brooklyn Coll.) Asst. Statistician, War Production Board, Washington, D.C. *2821-28th St. S.E., Washington 20, D.C.*
KAPLAN, WILFRED, Ph.D. (Harvard) Instr., Univ. of Michigan, Ann Arbor, Mich. *1308 Olivia Ave.*
KAPLANSKY, IRVING, Ph.D. (Harvard) Instr., Harvard Univ., Cambridge, Mass. *17 Sumner Rd.*
KARAPETOFF, Prof. VLADIMIR, M.M.E. (Leningrad) Emeritus, Elec. Eng., Cornell Univ., Ithaca, N.Y. *39 Claremont Ave., Apt. 84, New York, N.Y.*
KARL, Sister MARY CORDIA, Ph.D. (Johns Hopkins) Head of Dept., Coll. of Notre Dame of Maryland, N. Charles St., Baltimore, Md.
KARNES, Asst. Prof. H. T., Ph.D. (Peabody) Louisiana State Univ., University Sta., Baton Rouge, La. *Dept. of Math.*
KARNOW, HERMAN, A. M. (Colorado) Teacher, Tottenville High School, Tottenville, Staten Island 7, N.Y.
KARPINSKI, Prof. L. C., Ph.D. (Strassburg) Univ. of Michigan, Ann Arbor, Mich. *1315 Cambridge Rd.*
KARR, Asso. Prof. LOIS, A.M. (Wisconsin) Lindenwood Coll., St. Charles, Mo.
KARST, O. J., A.B. (Montclair State T.C.) Instr., Newark Coll. of Engineering, High St., Newark, N.J.
KASNER, Prof. EDWARD, Ph.D. (Columbia) Columbia Univ., New York, N.Y. *430 West 116 St.*
KATZ, MAX. Accountant, Katz, Zuckerman and Co., 50 Broad St., New York, N.Y.
KEARNEY, Asst. Prof. DORA E., A.M. (Minnesota) State Teachers Coll., Cedar Falls, Iowa. *1105 W. 23rd St.*
KEELER, Prof. B. C., A.M. (Columbia) Webb Inst. of Naval Archit., New York, N.Y. *48 Sagamore Road, Bronxville, N.Y.*
KEFFER, RALPH, A.M. (Wisconsin) Actuary, Aetna Life Ins. Co., Hartford, Conn.
KELLER, E. R., A.M. (Tennessee) Teacher, Central High School, Fountain City, Tenn. *Route 3, Maryville, Tenn.*
KELLER, Asst. Prof. M. W., Ph.D. (Indiana) Purdue Univ., West LaFayette, Ind. *138 Sheetz St.*
KELLEY, Asst. Prof. J. L., Ph.D. (Virginia) Univ. of Notre Dame, Notre Dame, Ind.
KELLS, Asso. Prof. L. M., Ph.D. (Columbia) U.S. Naval Acad., Annapolis, Md. *23 Thompson St.*
KELLY, Asst. Prof. K. D., M.S. (Chicago) Fenn Coll., Cleveland, Ohio
KELLY, L. M., A.M. (Boston Univ.) *Lt. (j.g.), Instr., U.S. Coast Guard Acad., New London, Conn. Dept. of Math.*
KELLY, MAY B., A.M. (Yale) Teacher, Bulkeley High School, Hartford, Conn. *93 Newport Ave., West Hartford, Conn.*
KEMPNER, Prof. A. J., Ph.D. (Göttingen) Head of Dept., Univ. of Colorado, Boulder, Colo.
KENDALL, Asso. Prof. CLARIBEL, Ph.D. (Chicago) Univ. of Colorado, Boulder, Colo. *1305 Euclid Ave.*
KENDALL, C. H., A.B. (Union Coll.), LL.B. (Buffalo) Head Attorney, War Production Board, Washington, D.C. *3426-16th St. N.W.*
KENNA, Sister ESTHER MARIA, A.M. (St. Elizabeth) Prof., Coll. of St. Elizabeth, Convent Station, N.J.
KENNEDY, Asso. Prof. E. C., Ph.D. (Rice) Texas Coll. of Arts and Indus., Kingsville, Tex. *1st Lt., Army Air Forces. 3810 Gulf Ave., Houston, Tex.*
KENNEDY, E. S., Ph.D. (Lehigh) Instr., Univ. of Alabama, University, Ala. *Capt., Inf. G-2 Div., General Staff, Washington, D.C.*
KENNEDY, EVELYN M., A.M. (Cincinnati) Indus. Economist, War Production Board, Washington, D.C. *1452 Fairmont St. N.W.*
KENNEY, Asst. Prof. J. F., A.M. (Michigan) Univ. of Wisconsin, Madison, Wis. *North Hall*
KENNISON, Asst. Prof. L. S., Ph.D. (Calif. Inst. of Tech.) Brooklyn Coll., Bedford Ave. and Ave. H., Brooklyn, N.Y. *Lt., U.S.N. 9 Twin Oak Drive, Hyattsville, Md.*
KENT, J. R. F., M.A. (Queen's Univ.) Instr., Univ. of Arkansas, Fayetteville, Ark. *Lt., R.C.N.V.R., Asst. to Dir. of Naval Educ., Naval Service Hqs., Ottawa, Ont., Can.*
KEPPLER, KATHARINE B. (Mrs. Kurt), A.M. (Bryn Mawr) Head of Dept., Foxcroft School, Middleburg, Va.
KERR, F. J. Merrick St., Pleasantville, Pa.

KETCHUM, Asst. Prof. P. W., Ph.D. (Illinois) Univ. of Illinois, Urbana, Ill. *Dept. of Math.*
KIEFER, Prof. E. C., M.S. (Michigan) James Millikin Univ., Decatur, Ill.
KIEFFER, NORA A., A.M. (Columbia) Instr., State Teachers Coll., Shippensburg, Pa. *P.O. Box 154*
KILLEN, Prof. C. G., M.S. (Louisiana State) State Normal Coll., Natchitoches, La. *429 Henry Ave.*
KIMBALL, Asso. Prof. S. H., Ph.D. (Harvard) Univ. of Maine, Orono, Me. *135 Stevens Hall*
KIMBALL, T. C., A.M. (Princeton) Master, Lawrenceville School, Lawrenceville, N.J. *Box 40*
KINGSTON, Prof. H. R., Ph.D. (Chicago) Head of Dept., Math. and Astr., Univ. of Western Ontario, London, Ont., Can.
KINNEY, J. M., Ph.D. (Chicago) Visiting Prof., Univ. of Chicago, Chicago, Ill. *8058 Bennett Ave., Chicago 17, Ill.*
KINSMAN, BLAIR, B.S. (Chicago) Teacher, Chm., Math. and Sci., Daycroft School, Stamford, Conn.
KIPLINGER, C. C., M.S. (Ohio State) Chm., Chem. Dept., State Teachers Coll., West Liberty, W. Va.
KIRBY, A. R., A.M. (Columbia) Lecturer, Math. and Commerce, School of Educ., Fordham Univ., New York 7, N.Y. *2921 Briggs Ave., New York 58, N.Y.*
KIRCHEN, C. J., A.M. (Wisconsin) Statistician, U.S. Rubber Co., Ordnance Plant, Des Moines 5, Iowa. *4028-11th St. Place, Des Moines, Iowa*
KIRCHNER, Prof. W. H., B.S. (Worcester Poly. Inst.) Emeritus, Univ. of Minnesota, Minneapolis, Minn. *722 Tenth Ave. S.E., Minneapolis 14, Minn.*
KIRKHAM, W. J., Ph.D. (Indiana) *In Service*
KLAUBER, L. M., A.B. (Stanford) Vice Pres. and Genl. Mgr., San Diego Gas and Elec. Co., San Diego, Calif. *233 W. Juniper St., San Diego 1, Calif.*
KLEENE, Asso. Prof. S. C., Ph.D. (Princeton) Amherst Coll., Amherst, Mass. *Lt., U.S.N.R., 419 West 119 St., New York 27, N.Y.*
KLINE, Prof. J. R., Ph.D. (Pennsylvania) Univ. of Pennsylvania, Philadelphia, Pa. *529 Riverview Rd., Swarthmore, Pa.*
KLINE, MORRIS, Ph.D. (New York Univ.) Instr., New York Univ., New York, N.Y. *Asso. Radio Engr., Eatontown Signal Lab., Eatontown, N.J. Sycamore Ave., Little Silver, N.J.*
KLINGER, E. L., A.M. (Illinois) Instr., Purdue Univ., West LaFayette, Ind. *126 North St.*
KLIPHARDT, R. A., B.S. (Armour Inst. of Tech.) Grad. Asst., Illinois Inst. of Tech., 3300 Federal St., Chicago 16, Ill. *2247 N. Avers Ave., Chicago, Ill.*
KLIPPLE, Asso. Prof. E. C., Ph.D. (Texas) A. and M. Coll. of Texas, College Station, Tex. *Faculty Exchange 107*
KNAPPER, J. S., M.S. (Pennsylvania State) Instr., Math. and Physics, Pennsylvania State Coll., Schuylkill Undergrad. Center, Pottsville, Pa. *1245 W. Market St.*
KNEBELMAN, Prof. M. S., Ph.D. (Princeton) Head of Dept., State Coll. of Washington, Pullman, Wash. *2008 Indiana St.*
KNEDLER, Prof. P. A., A.M. (Pennsylvania) State Teachers Coll., Kutztown, Pa. *East Texas, Pa.*
KNIGHT, Asst. Prof. L. C., A.M. (Columbia) Emeritus, Coll. of Wooster, Wooster, Ohio. *1028 N. Bever St.*
KNIGHT, L. C., Jr., A.M. (Kent) Head of Dept., Muskingum Coll., New Concord, Ohio. *Lakeside Drive*
KNOWLER, Asso. Prof. L. A., Ph.D. (Iowa) Univ. of Iowa, Iowa City, Iowa. *212 Physics Bldg.*
KNOX, Prof. J. J., M.S. (Chicago) Dakota Wesleyan Univ., Mitchell, S.D. *1219 W. University Blvd.*
KNOX, Asst. Prof. R. H., Jr., A.M. (Michigan) Virginia Milit. Inst., Lexington, Va. *313 Letcher Ave.*
KOCH, E. H., Jr., B.S. in E.E. (Pennsylvania) Retired, Tech. High School, Brooklyn, N.Y. *253 Cumberland St.*
KOEHLER, Asst. Prof. FULTON, Ph.D. (Minnesota) Univ. of Minnesota, Minneapolis, Minn. *Route 2, Hopkins, Minn.*
KOEHLER, Asst. Prof. T. L., A.M. (Pennsylvania) Muhlenberg Coll., Allentown, Pa. *625 North 24th St.*
KOKEN, J. C., A.B. (Missouri) Instr., Parks Air Coll., East St. Louis, Ill.
KOLCHIN, E. R., Ph.D. (Columbia) *In Service*
KOLEY, Sister VINCENT DE PAUL, M.S. (Notre Dame) Head of Dept., Mary Manse Coll., Toledo, Ohio
KOPP, P. J., A.M. (Duke) Colgate-Palmolive-Peet Co., Jersey City, N.J. *Major, Chem. Warfare Service, Washington, D.C. 2515 K Street N.W., Washington 7, D.C.*
KORGEN, Asso. Prof. R. L., A.M. (Harvard) Bowdoin Coll., Brunswick, Me. *Prince's Point*

KOVARIK, Prof. A. F., Ph.D. (Minnesota), Sc.D. (Manchester) Physics, Yale Univ., New Haven, Conn. *Sloane Lab.*

KRABILL, D. M., Ph.D. (Ohio State) Instr., Potomac State School, Keyser, W.Va. *Lt. (j.g.), U.S.N.R., Instr., Midshipmen's School, New York 27, N.Y. 523 West 121 St., New York 27, N.Y.*

KRAITCHIK, Asso. Prof. MAURICE, Dr. Math. (Liege; Brussels) New School for Social Research, New York, N.Y. *34-10 84th St., Jackson Heights, N.Y.*

KRAMER-LASSAR, EDNA E., Ph.D. (Columbia) Chm. of Dept., Thomas Jefferson High School, Brooklyn, N.Y. *Consultant, N.D.R.C. 32 Lenox Road, Brooklyn 26, N.Y.*

KRATHWOHL, Prof. W. C., Ph.D. (Chicago) Illinois Inst. of Tech., 3300 Federal St., Chicago 16, Ill.

KRAUS, G. R., M.S. (Carnegie Inst. of Tech.) Head of Dept., Math. and Physics, Gannon Coll. of Villa Maria Coll., Erie, Pa. *619 W. Ninth St.*

KREIDER, Dean O. C., M.S. (Iowa State) Ellsworth Jr. Coll., Iowa Falls, Iowa. *Lt., U.S.N.R. Asst. Prof., Naval Sci. and Tactics, Rensselaer Poly. Inst., Troy, N.Y.*

KRUEGER, Asso. Prof. R. L., Ph.D. (Marquette) Head of Dept., Wittenberg Coll., Springfield, Ohio

KRYLOFF, Prof. NICOLAS, Dr. of Math. *honoris causa* (Kieff) Acad. of Sciences, Bol. Kaluzhskaya 14, Moscow, U.S.S.R.

KUBIS, Asst. Prof. J. F., Ph.D. (Fordham) Grad. School, Fordham Univ., New York, N.Y

KUHN, Prof. H. W., Ph.D. (Cornell) Ohio State Univ., Columbus, Ohio. *1179 Fairview Ave.*

KULLBACK, SOLOMON, Ph.D. (George Washington) Lecturer in Stat., George Washington Univ., Washington, D.C. *Lt. Col., Signal Corps. 1259 Van Buren St. N.W., Washington 12, D.C.*

KUNKEL, Prof. P. V., Ph.D. (Columbia) Head of Dept., Cedar Crest Coll., Allentown, Pa. *Box 104, Trexlertown, Pa.*

KURZIN, W. H., M.S. (Chicago) Instr., Herzl Jr. Coll., Chicago, Ill. *1631 W. Roosevelt Rd.*

KUTMAN, Mrs. HELEN L., A.M. (Columbia) Instr., Hunter Coll., New York, N.Y. *2825 Grand Concourse*

LABOCETTA, Ing. LETTERIO, C.E. (Naples) Patent Atty., Via S. Basilio 50, Rome (105), Italy

LADNER, Asst. Prof. A. C., A.M. (Brown) Math. and Engg., Denison Univ., Granville, Ohio. *P.O. Box 253*

LADUE, MARY E., Ph.D. (Columbia) Instr., Barnard Coll., Broadway and 119 St., New York 27, N.Y.

LADY, Prof. C. H., A.M. (Southern California) Chm. of Dept., State Teachers Coll., Slippery Rock, Pa.

LAFFERTY, W. A., A.M. (Ohio State) Teacher, John Burroughs School, Clayton, Mo. *620 Cornelia Ave., Webster Groves, Mo.*

LAFON, Asst. Prof. J. E., A.M. (Oklahoma) Univ. of Oklahoma, Norman, Okla. *806 Monett St.*

LAMB, Prof. R. C., A.M. (Virginia) U.S. Naval Acad., Annapolis, Md. *Dept. of Math.*

LAMBERT, W. D., A.M. (Harvard) Chief, Sec. of Gravity and Astr., U.S. Coast and Geodetic Survey, Washington 25, D.C.

LAMPEN, Prof. A. E., A.M. (Michigan) Hope Coll., Holland, Mich. *86 E. 14th St.*

LAMPLAND, C. O., A.M. (Indiana) Lowell Observatory, Flagstaff, Ariz. *Bin 1640*

LANCASTER, Asst. Prof. O. E., Ph.D. (Harvard) Univ. of Maryland, College Park, Md. *Lt., U.S.N.R.*

LANCZOS, Prof. CORNELIUS, Ph.D. (Szeged) Purdue Univ., LaFayette, Ind. *Asso. Mathematician, Math'l Tables Project, Room 252, 50 Church St., New York, N.Y.*

LANDERS, A. W., Ph.D. (Chicago) Brooklyn Coll., Brooklyn, N.Y. *108-48 67th Drive, Forest Hills, N.Y.*

LANDERS, MARY K. (Mrs. A. W.), Ph.D. (Chicago) Instr., Hunter Coll., New York, N.Y. *108-48 67th Drive, Forest Hills, N.Y.*

LANDIN, JOSEPH, M.S. (New York Univ.) Instr., Univ. of Notre Dame, Notre Dame, Ind. *Dept. of Math.*

LANDRY, Prof. A. E., Ph.D. (Johns Hopkins) Catholic Univ. of America, Washington, D.C. *3624-13th St. N.E., Brookland, D.C.*

LANE, Prof. E. P., Ph.D. (Chicago) Chm. of Dept., Univ. of Chicago, Chicago, Ill. *Dept. of Math.*

LANE, Prof. H. I., Ph.D. (Cornell) Hendrix Coll., Conway, Ark. *Hendrix Sta.*

LANE, RUTH O., Ph.D. (Iowa) Instr., Northwest Missouri State Teachers Coll., Maryville, Mo.

LANG, G. B., Ph.D. (Illinois) Instr., Univ. of Florida, Gainesville, Fla. *231 Ray St.*

LANGE, LUISE, Ph.D. (Göttingen) Instr., Woodrow Wilson Jr. Coll., Chicago, Ill. *5851 Blackstone Ave.*

LANGER, Prof. R. E., Ph.D. (Harvard) Chm. of Dept., Univ. of Wisconsin, Madison, Wis. *822 Miami Pass, Madison 5, Wis.*

LA PAZ, Prof. LINCOLN, Ph.D. (Chicago) Ohio State Univ., Columbus, Ohio. *Mathematician, Office of Scientific Res. and Devel., Univ. of New Mexico, Albuquerque, N.M.*

LAREW, Prof. GILLIE A., Ph.D. (Chicago) Head of Dept., Randolph-Macon Woman's Coll., Lynchburg, Va.

LAROE, RACHAEL A., A.M. (Tennessee) Acting Instr., Physics, Oregon State Coll., Corvallis, Ore.

LARRIVEE, J. A., Ph.D (Catholic Univ.) Junior Astronomer, U.S. Naval Observ., Washington, D.C.

LARSEN, Asso. Prof. H. D., Ph.D. (Wisconsin) Univ. of New Mexico, Albuquerque, N.M.

LARSON, Asso. Prof. OLGA, A.M. (Missouri) State Coll. for Women, Tallahassee, Fla.

LASLEY, Prof. J. W., Jr., Ph.D. (Chicago) Univ. of North Carolina, Chapel Hill, N.C. *523 Rosemary Lane*

LATIMER, Prof. C. G., Ph.D. (Chicago) Univ. of Kentucky, Lexington, Ky. *Dept. of Math.*

LATSHAW, ELMER. Tech. Engr., J. G. Brill Co., Philadelphia, Pa. *1839 N. 60th St.*

LATSHAW, Asst. Prof. V. V., Ph.D. (Indiana) Lehigh Univ., Bethlehem, Pa.

LAURENTINE MARIE, Sister, A.M. (Trinity Coll., Wash., D.C.) Prof., Emmanuel Coll., 400 The Fenway, Boston 17, Mass.

LAVOIE, E. S., A.B. (Brooklyn Coll.) Patrolman, New York, N.Y. *Ensign, Submarine Officer's Training School, New London, Conn. 135 Sheridan Ave., Brooklyn, N.Y.*

LAYTON, W. I., M.S. (South Carolina) Instr., Math. and Engg., Amarillo Coll., Amarillo, Tex.

LAZAR, NATHAN, Ph.D. (Columbia) Teacher, Bronx High School of Sci., New York, N.Y.

LEAVENS, D. H., A.M. (Yale) Research Asso., Cowles Comm. for Research in Econ., Univ. of Chicago, Chicago 37, Ill.

LEE, Asst. Prof. H. L., Ph.D. (Duke) Univ. of Tennessee, Knoxville, Tenn. *Box 4052 Univ. Sta.*

LEE, MARY A., A.M. (Wisconsin) Grad. Asst., Cornell Univ., Ithaca, N.Y. *White Hall*

LEECH, J. S., M.S. (Oklahoma) Instr., Yale Univ., New Haven, Conn.

LEFSCHETZ, Prof. SOLOMON, Ph.D. (Clark) Princeton Univ., Princeton, N.J. *Fine Hall*

LEHMANN, C. H., A.M. (Columbia) Instr., Cooper Union, New York, N.Y. *Chm. of Dept., Defense Training Inst., Brooklyn, N.Y. 144-17 29th Ave., Flushing, N.Y.*

LEHMER, Asso. Prof. D. H., Ph.D. (Brown) Univ. of California, Berkeley, Calif. *942 Hilldale Ave.*

LEHNER, JOSEPH, Ph.D. (Pennsylvania) Kellex Corp., New York, N.Y. *140 Eighth Ave., Brooklyn 15, N.Y.*

LEHR, Asso. Prof. MARGUERITE, Ph.D. (Bryn Mawr) Bryn Mawr Coll., Bryn Mawr, Pa. *Cartref*

LEIFER, H. R., A.B. (Pittsburgh) Asst., U.S. Dept. of Labor, Philadelphia, Pa. *Sergeant, Ordnance, Co. A, Hq. Bn., Ordnance Trg. Center, Aberdeen Proving Ground, Md.*

LEMME, Asso. Prof. M. M., A.M. (Indiana) Univ. of Toledo, Toledo, Ohio. *Lt., U.S.N.R. 3023 W. Bancroft St., Toledo, Ohio*

LENNAHAN, C. M., A.B. (George Washington) Asst. Meteorologist, U.S. Weather Bureau, Commonwealth Airport, East Boston, Mass. *15 Appalachian Road, Winchester, Mass.*

LEONARD, Prof. H. B., Ph.D. (Colorado) Univ. of Arizona, Tucson, Ariz. *Box 4024 Univ. Sta.*

LESTER, CAROLINE A., Ph.D. (Wisconsin) Instr., New York State Coll. for Teachers, Albany, N.Y. *Lt. (j.g.), U.S. Coast Guard Reserve, Coast Guard Headquarters, Washington, D.C.*

LESTOURGEON, Asso. Prof. F. ELIZABETH, Ph.D. (Chicago) Univ. of Kentucky, Lexington, Ky. *630 Maxwelton Court*

LEVEQUE, W. J. Instr., Univ. of Colorado, Boulder, Colo. *387-15th St.*

LEVINE, Asso. Prof. JACK, Ph.D. (Princeton) North Carolina State Coll., Raleigh, N.C.

LEVINE, L. D., A.B. (Brooklyn) Instr., Carnegie Inst. of Tech., Pittsburgh 13, Pa.

LEVY, Asst. Prof. HARRY, Ph.D. (Princeton) Univ. of Illinois, Urbana, Ill. *358 Math. Bldg.*

LEVY, HERMAN, A.B. (New York Univ.) 3736 Oceanic Ave., Brooklyn 24, N.Y.

LEVY, Asso. Prof. SOPHIA H., Ph.D. (California) Univ. of California, Berkeley, Calif. *453 Wheeler Hall*

LEWIS, Prof. A. J., Ph.D. (Colorado) Univ. of Denver, Denver, Colo. *2136 S. Josephine St.*

LEWIS, Asso. Prof. C. F., M.S. (Kansas State) Kansas State Coll., Manhattan, Kans.

LEWIS, Asso. Prof. D. C., Jr., Ph.D. (Harvard) Univ. of New Hampshire, Durham, N.H. *Research Mathematician, N.D.R.C. 401 West 118 St., New York, N.Y.*

LEWIS, Prof. F. A., Ph.D. (Ohio State) Univ. of Alabama, University, Ala. *Box 1444*

LEWIS, Prof. FLORENCE P., Ph.D. (Johns Hopkins) Goucher Coll., Baltimore, Md. *2435 N. Charles St.*

LEWIS, J. H., A.M. (Washington and Jefferson) Teacher, Darrow School, New Lebanon, N.Y.

LIEBER, LILLIAN R. (Mrs. H. G.), Ph.D. (Clark) Dir., Galois Inst. of Math., Long Island Univ., Brooklyn, N.Y. *258 Clinton Ave., Brooklyn 5, N.Y.*

LINARES, ENRIQUE, Jr., B.S. in E.E. (Univ. of Santa Clara) Gen. Agt., Cerveceria Nacional, David, R.P. *P.O. Box 540, Panama City, R.P.*

LINDQUIST, Prof. THEODORE, Ph.D. (Chicago) Head of Dept., State Normal Coll., Ypsilanti, Mich. *103 Elm St.*

LINEHAN, Prof. P. H., Ph.D. (Columbia) Coll. of the City of New York, New York, N.Y. *346 Convent Ave., New York 31, N.Y.*

LINFIELD, Asso. Prof. B. Z., Ph.D. (Harvard) Univ. of Virginia, University, Va. *1324 Hilltop Road, Charlottesville, Va.*

LINSCHEID, H. W., M.E. (Phillips Univ.), A.M. (Oklahoma) Instr., Univ. of Nebraska, Lincoln, Nebr. *1900 High St., Lincoln 2, Nebr.*

LIPSICH, H. D., A.B. (Cincinnati) Teaching Fellow, Univ. of Cincinnati, Cincinnati, Ohio. *3502 Clifton Ave.*

LITTAUER, S. B., Ph.D. (Mass. Inst. of Tech.) Engr., Bendix Aviation Corp., Towson, Md. *408 Alleghany Ave., Towson 4, Md.*

LITTERICK, W. S., Ed.D. (Rutgers) Dir. of Studies, The Peddie School, Hightstown, N.J. *340 S. Main St.*

LITTLE, Asst. Prof. NEIL, A.M. (Michigan) Purdue Univ., LaFayette, Ind.

LITZINGER, Prof. MARIE, Ph.D. (Chicago) Mount Holyoke Coll., South Hadley, Mass.

LIVINGSTON, Prof. G. R., A.M. (California) San Diego State Coll., San Diego, Calif.

LLOYD, OLWEN (Mrs. George), M.A. (Cambridge, England) Headmistress, Mount Vernon Seminary, 3701 Nebraska Ave., Washington, D.C.

LOCH, JOSEPH. *Corporal, U.S. Army. 2027 N. Sheffield Ave., Chicago, Ill.*

LOCKE, Prof. J. F., Ph.D. (Illinois) Head of Dept., Memphis State Coll., Memphis, Tenn.

LOCKWOOD, E. C., A.M. (Brown) Instr., Mount Hermon School, Mount Hermon, Mass.

LOFLIN, Asst. Prof. Z. L., M.S. (Louisiana) Southwestern Louisiana Inst., Lafayette, La. *Box 353 S.L.I.*

LOGSDON, Mrs. MAYME I., Ph.D. (Chicago) Asso. Prof., Univ. of Chicago, Chicago, Ill.

LONDON, LIONEL, B.S.C.E. (Illinois) Analyst, A. O. Smith Corp., Milwaukee, Wis. *1315 E. Elmdale Court, Milwaukee 11, Wis.*

LONG, Asst. Prof. FLORENCE, M.S. (Illinois) Earlham Coll., Earlham, Ind.

LONG, Asst. Prof. T. R., A.M. (Rochester) Univ. of Rochester, Rochester, N.Y.

LONGENECKER, J. V., M.S. (Iowa) Actuary, Farmers and Bankers Life Ins. Co., Wichita, Kans. *Box 580*

LONGFELLOW, NATALIE M., A.M. (Chicago) Head of Dept., The Chapin School, New York, N.Y. *47 East 64 St.*

LONGLEY, Prof. W. R., Ph.D. (Chicago) Yale Univ., New Haven, Conn.

LONSETH, A. T., Ph.D. (California) Instr., Iowa State Coll., Ames, Iowa. *Dept. of Math.*

LORING, S. J., B.S. (Mass. Inst. of Tech.) Research Engr., Chance Vought Aircraft, Stratford, Conn. *29 Stiles St.*

DE LOSADA Y PUGA, Prof. CRISTÓBAL, D.Sc. (Lima) Catholic Univ. of Peru, Lima, Peru. *Apartado 2708*

LOVE, Prof. C. E., Ph.D. (Michigan) Univ. of Michigan, Ann Arbor, Mich. *1915 Scottwood Ave.*

LOVETT, Pres. E. O., Ph.D. (Virginia; Leipzig) Retired, Rice Inst., Houston, Tex.

LOVITT, Prof. W. V., Ph.D. (Chicago) Colorado Coll., Colorado Springs, Colo. *1927 Wood Ave.*

LOWENSTEIN, Asso. Prof. L. L., Ph.D. (Cornell) Chm. of Dept., Alfred Univ., Alfred, N.Y.

LUBBEN, Asso. Prof. R. G., Ph.D. (Texas) Univ. of Texas, Austin, Tex. *W.H. 16, Univ. Sta.*

LUBIN, Asso. Prof. C. I., Ph.D. (Harvard) Coll. of Eng., Univ. of Cincinnati, Cincinnati, Ohio. *Kellex Corp., 233 Broadway, New York, N.Y.*

LUGINBUHL, R. T., B.S. (Ursinus) Asst. Instr., Univ. of Pennsylvania, Philadelphia 4, Pa. *Box 40 College Hall*

LUNDBERG, G. H., A.M. (Colo. State Coll. Educ.; Vanderbilt) Instr., Vanderbilt Univ., Nashville, Tenn. *2310 Highland Ave.*

LUNN, Prof. A. C., Ph.D. (Chicago) Emeritus, Univ. of Chicago, Chicago, Ill. *5211 Kenwood Ave.*

LUTEYN, Asst. Prof. PETER, M.S. (Iowa) Marquette Univ., Milwaukee, Wis. *8223 Portland Ave., Wauwatosa, Wis.*

LUTHER, Prof. C. F., Ph.D. (Stanford) Dean, Coll. of Liberal Arts, Willamette Univ., Salem, Ore.

LUTHER, Asst. Prof. H. A., Ph.D. (Iowa) A. and M. Coll. of Texas, College Station, Tex. *220 Academic Bldg.*

LYLE, Asso. Prof. G. A., M.S. (Lehigh) U.S. Naval Acad., Annapolis, Md. *Wardour*

MacColl, L. A., Ph.D. (Columbia) Research Mathematician, Bell Telephone Labs., 463 West St., New York 14, N.Y.
MacCreadie, Asso. Prof. W. T., Ph.D. (Cornell) Bucknell Univ., Lewisburg, Pa. *104-13th St.*
MacCullough, Prof. R. H., M.S. (Lafayette) Defiance Coll., Defiance, Ohio
MacDonald, A. W., A.M. (N.J. State T.C., Montclair) Teacher, Essex Co. Boys Voc. School, Newark, N.J. *30 Washington St., Belleville, N.J.*
Macdonald, Prof. S. L., M.S. (Columbia) Emeritus, Math. and Astr., Colorado State Coll. of A. and M.A., Fort Collins, Colo. *Springdale, Ark.*
MacDonald, Prof. W. E., A.M. (Harvard) Lignan Univ., Canton, China
MacDougal, Prof. H. B., M.S. (Iowa) Acting Head of Dept., South Dakota State Coll., Brookings, S.D.
MacDuffee, Prof. C. C., Ph.D. (Chicago) Univ. of Wisconsin, Madison, Wis. *211 Lathrop St.*
MacEwen, D. M., Ph.D. (New York Univ.) Instr., Coll. of the City of New York, 17 Lexington Ave., New York, N.Y. *55 East 65 St.*
Mackie, Prof. E. L., Ph.D. (Chicago) Univ. of North Carolina, Chapel Hill, N.C. *702 Gimghoul Road*
Mac Lane, Asso. Prof. Saunders, Ph.D. (Göttingen) Harvard Univ., Cambridge, Mass. *7 Avon St.*
MacNeille, Prof. H. M., Ph.D. (Harvard) Kenyon Coll., Gambier, Ohio. *Box 188*
Mac Neish, Prof. H. F., Ph.D. (Chicago) Chm. of Dept., Brooklyn Coll., Brooklyn, N.Y. *48 Taunton Road, Scarsdale, N.Y.*
Macphail, Asst. Prof. M. S., Ph.D. (Oxford) Acadia Univ., Wolfville, N.S., Can.
Maddaus, Asst. Prof. Ingo, Jr., Ph.D. (Michigan) Univ. of Oregon, Eugene, Ore.
Madden, Sister Teresa Marie, A.M. (Boston Coll.) Prof., Coll. of Our Lady of the Elms, Chicopee, Mass.
Maddox, Prof. A. C., A.M. (Columbia) State Normal Coll., Natchitoches, La. *405 New Second St.*
Maddrill, J. D., Ph.D. (California) Consulting Actuary and Engineer, 828 Eaton Road, Drexel Hill, Pa. *Statistician, War Dept. Ordnance*
Mahoney, Asst. Prof. J. J., Ph.D. (California) Loyola Univ., Chicago, Ill. *1st Lt., A.U.S., Air Corps, 802 N. Orange Ave., Orlando, Fla.*
Makarov, A. G., A.M. (Pennsylvania) Address unknown
Mallory, Prof. A. E., Ph.D. (George Peabody Coll.) Colorado State Coll. of Educ., Greeley, Colo.
Mallory, Prof. V. S., Ph.D. (Columbia) Head of Dept., State Teachers Coll., Montclair, N.J.
Maloney, Sister Thomas Marie, A.M. (Catholic Univ.) Instr., Trinity Coll., Washington, D.C.
Manchester, Prof. R. E., A.M. (Michigan) Head of Dept., Dean of Men, Kent State Univ., Kent, Ohio
Mancill, Asso. Prof. J. D., Ph.D. (Chicago) Univ. of Alabama, University, Ala.
Mandel, John, M.S. (Brussels) Chemist, Foster D. Snell, Inc., Brooklyn, N.Y. *45 Kew Gardens Road, Kew Gardens, N.Y.*
Mandelbrojt, Szolem, Dr. ès Sc. (Paris) Visiting Prof., Rice Inst., Houston, Tex.
Manning, Prof. F. L., Ph.D. (Cornell) Ursinus Coll., Collegeville, Pa. *68 Sixth Ave.*
Manning, Asso. Prof. H. P., Ph.D. (Johns Hopkins) Emeritus, Brown Univ., Providence, R.I. *148 Governor St.*
Manning, Asso. Prof. M. L., M.S. (Pittsburgh) Elec. Engg.; Supervisor, High Voltage Lab., Cornell Univ., Ithaca, N. Y. *School of Elec. Eng.*
Mansfield, Ralph, M.S. (Chicago) Instr., Chicago Teachers Coll., 6800 Stewart Ave., Chicago, Ill.
Manson, Prof. E. S., M.S. (Mass. Inst. of Tech.) Astr., Ohio State Univ., Columbus, Ohio. *Observatory*
Many, Prof. Anna E., A.M. (Tulane) Sophie Newcomb Coll., New Orleans 18, La.
Maple, C. G., A.M. (Cincinnati) Instr., Ohio State Univ., Columbus, Ohio. *1666 W. Fifth Ave.*
Marburger, Clifford, A.M. (Franklin and Marshall) Instr., Franklin and Marshall Acad. Lancaster, Pa. *Denver, Pa.*
March, Prof. H. W., Ph.D. (Munich) Univ. of Wisconsin, Madison, Wis. *Chief Mathematician, U.S. Forest Products Lab. 1825 Summit Ave., Madison 5, Wis.*
Marcou, Asst. Prof. R. J., B.S. (Colby) Boston Coll., Chestnut Hill, Mass. *Dept. of Math.*
Marden, Asso. Prof. Morris, Ph.D. (Harvard) Univ. of Wisconsin, Milwaukee, Wis. *403 E. Carlisle Ave.*
Maria, D. May Hickey (Mrs. A. J.), Ph.D. (Rice) Brooklyn Coll., Brooklyn, N.Y. *Dept. of Math.*

MARM, ANNA, A.M. (Kansas) Instr., Univ. of Kansas, Lawrence, Kans. *1238 Mississippi St.*
MARQUIS, Prof. R. H., Ph.D. (Chicago) Ohio Univ., Athens, Ohio. *Box 216*
MARRIOTT, Prof. R. W., Ph.D. (Pennsylvania) Swarthmore Coll., Swarthmore, Pa. *213 Lafayette Ave.*
MARTH, ELLA, M.S. (St. Louis Univ.) Teacher, Eliot School, St. Louis, Mo. *4521a Clarence Ave., St. Louis 15, Mo.*
MARTIN, Prof. A. W., Ph.D. (Chicago) Coll. of Puget Sound, Tacoma, Wash. *3209 N. 15th St., Tacoma 6, Wash.*
MARTIN, JEROME, Ph.D. (California) Research Dir., Commercial Solvents Corp., 506 Osborne St., Terre Haute, Ind.
MARTIN, MARGARET P., A.M. (Minnesota) Instr., Biostatistics, DeLamar Inst. of Pub. Health, 600 West 168 St., New York 32, N.Y.
MARTIN, W. A., A.M. (Alabama) *Lt., U.S.N.R.*
MARTIN, Prof. W. T., Ph.D. (Illinois) Chm. of Dept., Syracuse Univ., Syracuse 10, N.Y. *Dept. of Math.*
MARTYN, W. J., M.A. (New Zealand) Mathematical Master, Otago Boys' High School, Dunedin, New Zealand
MARY DANIEL, Sister, Ph.D. (Fordham) Prof., Marywood Coll., Scranton, Pa.
MARY ESTHER, Sister (Gladys-Mary E. Campbell), A.M. (California) Instr., Mundelein Coll., Chicago, Ill. *6363 Sheridan Road*
MARY FELICE, Sister, Ph.D. (Catholic Univ.) Prof., Mount Mary Coll., Milwaukee 13, Wis.
MARY GERTRUDE, Sister, M.S. (Marquette) Instr., St. Clare Coll., St. Francis, Wis.
MARY OF MERCY, Sister (Fitzpatrick), A.M. (Catholic Univ.) Instr., Incarnate Word Coll., San Antonio, Tex.
MARY PAULA, Sister, M.S. (Notre Dame) Prof., Marygrove Coll., 8425 W. McNichols Road, Detroit 21, Mich.
MASON, Asso. Prof. S. L., A.M. (Michigan) Univ. of North Dakota, Grand Forks, N.D. *2205 Fourth Ave. N.*
MASON, Asso. Prof. W. E., M.E. (Michigan) Univ. of California at Los Angeles, 405 Hilgard Ave., Los Angeles 24, Calif.
MASSEY, W. L., A.M. (Duke) Instr., Univ. of Chattanooga, Chattanooga, Tenn.
MATHEWSON, Prof. L. C., Ph.D. (Illinois) Dartmouth Coll., Hanover, N.H.
MATHIAS, FLORENTINA, A.M. (Ohio State) Teacher, Chillicothe High School, Chillicothe, Ohio. *625 Seminole Road*
MATHIAS, Asst. Prof. H. R., A.M. (Indiana) Bowling Green State Univ., Bowling Green, Ohio. *123 E. Evers Ave.*
MAY, LIDA B., A.M. (Texas) Instr., Texas Tech. Coll., Lubbock, Tex. *2409-14th St.*
MAYOR, Prof. J. R., Ph.D. (Wisconsin) Southern Illinois Normal Univ., Carbondale, Ill.
MAYS, W. J., A.M. (Vanderbilt) Actuarial Student, Volunteer State Life Ins. Co., Chattanooga, Tenn. *507½ W. Fourth St.*
MCBRIEN, V. O., Ph.D. (Catholic Univ.) Instr., Hamilton Coll., Clinton, N.Y.
MCCAMMAN, CAROL V., A.M. (California) Teacher, McKinley High School, Washington, D.C. *3500-14th St. N.W., Apt. 106, Washington 10, D.C.*
MCCARTHY, ANNE S., A.M. (Boston Coll.) 32 Auburn St., Brookline, Mass.
MCCARTHY, Asst. Prof. E. D., A.M. (Pennsylvania State) Eng. Coll., Univ. of Detroit, Detroit, Mich.
MCCARTHY, J. J., M.S. (New York Univ.) *1st Lt., 701st Coast Artillery. 128 Marine Ave., Brooklyn, N.Y.*
MCCARTY, A. L., A.M. (California) Instr., Jr. Coll., San Francisco, Calif. *1798 Grove St., Apt. 6*
MCCLELLAN, ADA A., B.S. (Chicago) Teacher, High School, Long Beach, Calif. *313 N. New Hampshire Ave., Los Angeles, Calif.*
MCCLELLAND, Asst. Prof. J. N., A.M. (Drake) Drake Univ., Des Moines, Iowa
MCCLENON, Prof. R. B., Ph.D. (Yale) Grinnell Coll., Grinnell, Iowa. *1105 Park St.*
MCCOLGIN, GLADYS B. (Mrs. O. R.), Ed.M. (Harvard), A.M. (Radcliffe) 1556 Brookside Ave., Indianapolis, Ind.
MCCONNELL, H. J. Engr., U.S. Engineer Office, Los Angeles, Calif. *3328 Madison Ave., San Diego, Calif.*
MCCORMICK, Prof. C. T., Ph.D. (Indiana) Head of Dept., Fort Hays Kansas State Coll., Hays, Kans.
MCCOY, DOROTHY, Ph.D. (Iowa) Head of Dept., Belhaven Coll., Jackson, Miss.
MCCOY, Prof. N. H., Ph.D. (Iowa) Smith Coll., Northampton, Mass. *53 Ridgewood Terrace*
MCCREA, Prof. W. H., Ph.D. (Cambridge) Queen's Univ., Belfast, Northern Ireland. *Flight-Lieutenant, R.A.F.*

McCULLEY, W. S., M.S. (A. and M. Coll. of Texas) Instr., A. and M. Coll. of Texas, College Station, Tex. *Major, Chemical Warfare Service. Box 279 Faculty Exchange, College Station, Tex.*

McCUTCHEON, G. J., B.S. (Minnesota) Teacher, University High School, Univ. of Minnesota, Minneapolis, Minn. *90 Malcolm Ave. S.E., Minneapolis 14, Minn.*

McDILL, Prof. R. M., A.M. (Indiana) Hastings Coll., Hastings, Nebr. *129 E. 7th St.*

McDONOUGH, D. L., Ph.D. (Pennsylvania) Head of Dept., South Philadelphia High School for Boys, Philadelphia, Pa. *1205 Belfield Ave., Drexel Hill, Pa.*

McDOUGLE, EDITH A., A.B. (Delaware) Instr., Women's Coll., Univ. of Delaware, Newark, Del.

McEWEN, Prof. G. F., Ph.D. (Stanford) Scripps Institution of Oceanography, La Jolla, Calif. *Box 109*

McEWEN, Prof. W. H., Ph.D. (Minnesota) Mount Allison Univ., Sackville, N.B., Can.

McEWEN, W. R., A.M. (Minnesota) Instr., Univ. of Minnesota, Minneapolis, Minn. *Dept. of Math. and Mech.*

McFADDEN, LEONARD, Ph.D. (Brown) Instr., Virginia Poly. Inst., Blacksburg, Va. *Box 65*

McFARLAN, Asso. Prof. L. H., Ph.D. (Missouri) Univ. of Washington, Seattle, Wash.

McFARLAND, Asso. Prof. DORA, Ph.D. (Chicago) Univ. of Oklahoma, Norman, Okla. *Faculty Exchange*

McFARLAND, ELSIE J., Ph.D. (California) Instr., Boise Jr. Coll., Boise, Idaho

McGAVOCK, Prof. W. G., Ph.D. (Duke) Davidson Coll., Davidson, N.C.

McGAW, Prof. F. M., B.S. (Wesleyan Univ.) Emeritus, Math. and Eng. Drawing, Cornell Coll., Mt. Vernon, Iowa. *Recalled to active service*

McGLADE, J. J., A.M. (Montclair State T.C.) Instr., Coll. of Paterson, Paterson, N.J.

McGRATH, Rev. P. H., A.M. (Woodstock Coll.) Prof., St. Peter's Coll., 144 Grand St., Jersey City, N.J.

McINNIS, Asst. Prof. S. W., A.M. (Florida) Univ. of Florida, Gainesville, Fla. *1417 W. McCormick St.*

McKELVEY, Prof. J. V., Ph.D. (Cornell) Iowa State Coll., Ames, Iowa. *2117 Graeber St.*

McKELVEY, MARTHA M. (Mrs. J. V.), M.S. (Iowa) 2117 Graeber St., Ames, Iowa

McKENNA, MARY, A.M. (Columbia) Teacher, Washington Irving High School, New York, N.Y. *17 East 11 St.*

McKENNEY, Rev. J. L., A.M. (Manhattan) Prof., Providence Coll., Providence, R.I.

McKISSOCK, Mrs. EDITH J., M.E. (Akron) Prof., Youngstown Coll., Youngstown, Ohio

McLAUGHLIN, K. F., A.M. (Yale) *Ensign, U.S.N.R.*

McLAUGHLIN, W. A., Pet. E. (Colo. Mines) Jones Field, Bonham, Tex.

McMAHON, F. A., A.M. (Brooklyn Coll.) Instr., Anti-Aircraft Director School, Sperry Gyroscope Co., Inc., Brooklyn, N.Y. *40-18 Forley St., Elmhurst, N.Y.*

McMASTER, Asst. Prof. A. S., M.S. in C.E. (Colorado) Eng. Math., Univ. of Colorado, Boulder, Colo. *College of Eng.*

McNAIR, J. S., M.S. (Chicago) Instr., Canal Zone Jr. Coll., Balboa Heights, Canal Zone. *Box 933*

McNEAL, R. L., B.S. in E.E. (Purdue) Head of Tech. Data Section, General Motors Proving Ground, Milford, Mich. *P.O. Box 338*

McNEARY, S. S., A.M. (Pennsylvania) Instr., Drexel Inst., Philadelphia 4, Pa.

McNEIL, Sister MARIE GERTRUDE, M.S. (Notre Dame) Prof., Seton Hill Coll., Greensburg, Pa.

McNELLY, Sister PRESENTATION, A.M. (Catholic Univ.) Prof., Our Lady of the Lake Coll., San Antonio, Tex.

McSHANE, Prof. E. J., Ph.D. (Chicago) Univ. of Virginia, Charlottesville, Va. *209 Maury Ave.*

McSWEENY, Prof. A. A., A.M. (Montana) Head of Dept., John Tarleton Agric. Coll., Stephenville, Tex. *Box 368, Tarleton Station, Tex.*

MEAD, L. V., A.M. (Ohio State) Instr., Univ. of Florida, Gainesville, Fla. *345 W. McCormick St.*

MEAD, Mrs. SALLIE P., A.M. (Columbia) Tech. Staff, Bell Telephone Labs., 463 West St., New York, N.Y.

MEARS, Asso. Prof. FLORENCE M., Ph.D. (Cornell) George Washington Univ., Washington, D.C.

MEBANE, Asso. Prof. W. N., Jr., A.M. (Cornell) Davidson Coll., Davidson, N.C. *Box 274*

MEDER, Asso. Prof. A. E., Jr., A.M. (Columbia) New Jersey Coll. for Women, New Brunswick, N.J.

MEHLENBACHER, Prof. L. E., Ph.D. (Michigan) Head of Dept., State Teachers Coll., Flagstaff, Ariz. *Dept. of Math.*

MEHR, EMANUEL, A.M. (Brooklyn) 290 Empire Blvd., Brooklyn, N.Y.

MELVILLE, Prof. C. E., A.B. (Northwestern) Clark Univ., Worcester, Mass. *950 Main St.*

MENGER, Prof. KARL, Ph.D. (Vienna) Univ. of Notre Dame, Notre Dame, Ind. *1921 E. La Salle St.*

MERCEDES, Sister M. Prof., Coll. of St. Scholastica, Duluth, Minn.
MERCEDES, Sister M., M.S. (Notre Dame) Instr., Mary Manse Coll., Toledo, Ohio. *2413 Collingwood Ave., Toledo 10, Ohio*
MERGENDAHL, Prof. T. E., M.S. (Tufts) Tufts Coll., Tufts College, Mass. *128 Professor's Row*
MERRILL, Prof. A. S., Ph.D. (Chicago) Chm., Div. of Phys. Sci., Montana State Univ., Missoula, Mont.
MERRILL, Prof. HELEN A., Ph.D. (Yale) Emeritus, Wellesley Coll., Wellesley, Mass. *6 Roanoke Road*
MERRILL, Asst. Prof. L. L., Ph.D. (Rensselaer) Rensselaer Poly. Inst., Troy, N.Y. *1577 Tibbits Ave.*
MERRIMAN, Asso. Prof. G. M., Ph.D. (Cincinnati) Univ. of Cincinnati, Cincinnati 21, Ohio
MERRISS, A. A. 4227 N.E. 23rd Ave., Portland, Ore.
MERTIE, J. B., Jr., Ph.D. (Johns Hopkins) Senior Geologist, U.S. Geological Survey, Washington, D.C.
MESSICK, Prof. C. A., Ph.D. (Chicago) Park Coll., Parkville, Mo.
MESSICK, Prof. J. F., Ph.D. (Johns Hopkins) Emory Univ., Emory University, Ga.
MEWBORN, Asst. Prof. A. B., Ph.D. (Calif. Inst. of Tech.) Univ. of Arizona, Tucson, Ariz. *Lt., U.S.N.R., Instr., Naval Air Station, Pasco, Wash. Box 4425 University Sta., Tucson, Ariz.*
MEYER, Prof. H. A., Ph.D. (Iowa) Hanover Coll., Hanover, Ind. *Acting Prof., Indiana Univ., Bloomington, Ind. Dept. of Math.*
MEYER, H. L., Jr., M.S. (Chicago) Instr., Univ. of Chicago, Chicago, Ill. *Dept. of Math.*
MICHAEL, W. B., A.B. (U.C.L.A.) Instr., Pasadena Jr. Coll., Pasadena, Calif. *388 S. Oak Ave., Pasadena 8, Calif.*
MICHAL, Prof. A. D., Ph.D. (Rice) California Inst. of Tech., Pasadena 4, Calif.
MICHEL, R. J., Ph.D. (Missouri) Head of Dept., Southeast Missouri State Teachers Coll., Cape Girardeau, Mo. *225 N. Ellis St.*
MICHIE, Prof. J. N., A.M. (Michigan) Head of Dept., Texas Tech. Coll., Lubbock, Tex. *Box 91, Tech. Sta.*
MICKELSON, E. L., Ph.D. (Minnesota) *Lt. Col., Coast Artillery Corps. 504 W. Market St., Silver City, N.M.*
MICKLE, E. J., Ph.D. (Ohio State) Instr., Ohio State Univ., Columbus, Ohio. *Dept. of Math.*
MIDDLEMISS, Asso. Prof. R. R., M.S. (Colorado) Washington Univ., St. Louis, Mo.
MIKESH, J. S. Lawrenceville School, Lawrenceville, N.J.
MILES, Asso. Prof. E. J., Ph.D. (Chicago) Yale Univ., New Haven, Conn. *87 Marvel Road*
MILES, H. J., Ph.D. (California) Asso., Univ. of Illinois, Urbana, Ill. *369 Math. Bldg.*
MILKMAN, JOSEPH, A.M. (Brooklyn) Tutor, Coll. of the City of New York, New York, N.Y. *299 Adelphi St., Brooklyn 5, N.Y.*
MILLER, A. L., Ph.D. (Harvard) Treas. and Genl. Mgr., C. N. Miller Co., Boston, Mass. *160 Washington St. N.*
MILLER, Prof. C. E., Ph.D. (Toronto) Univ. of New Brunswick, Fredericton, N.B., Can.
MILLER, Asst. Prof. D. D., Ph.D. (Michigan) Ohio Univ., Athens, Ohio. *Lt., U.S.N.R.*
MILLER, Prof. E. B., A.M. (Chicago) Head of Dept., Illinois Coll., Jacksonville, Ill. *1252 W. College Ave.*
MILLER, E. D., A.B. (Stanford) Instr., Yuba Junior Coll., Marysville, Calif.
MILLER, Prof. F. H., Ph.D. (Columbia) Head of Dept., Cooper Union, Cooper Square, New York, N.Y.
MILLER, Prof. G. A., Ph.D. (Cumberland) Emeritus, Univ. of Illinois, Urbana, Ill. *1203 W. Illinois St.* Honorary Life Member
MILLER, Asst. Prof. G. T., Ph.D. (Purdue) Purdue Univ., LaFayette, Ind. *601 Dodge St., West Lafayette, Ind.*
MILLER, Prof. J. S., Sc.D. (Virginia) Emory and Henry Coll., Emory, Va.
MILLER, K. W., M.S. (Union Coll.) Dir. of Research, Commonwealth Edison Co., Room 806, Edison Bldg., 72 W. Adams St., Chicago, Ill.
MILLER, LEONARD, A.B. (Brooklyn Coll.) *Sergeant, U. S. Army. 1726 Union St., Brooklyn, N.Y.*
MILLER, Prof. NORMAN, Ph.D. (Harvard) Queen's Univ., Kingston, Ont., Can.
MILLER, Asst. Prof. W. I., Ph.D. (Pittsburgh) Bucknell Univ., Lewisburg, Pa. *220 S. Third St.*
MILLER, Asst. Prof. W. M., Ph.D. (Illinois) Massachusetts State Coll., Amherst, Mass. *78 Woodside Ave.*
MILLESON, HELEN K., M.S. (Iowa) Carleton Coll., Northfield, Minn. *Goodsell Observatory*
MILLINGTON, Asst. Prof. H. G., C.E. (Rensselaer) Univ. of Vermont, Burlington, Vt. *225 Plattsburg Ave.*
MILLS, Prof. C. N., Ph.D. (Wisconsin) Head of Dept., Illinois State Normal Univ., Normal, Ill. *304 Virginia Ave.*

MILLS, W. H., A.B. (Swarthmore) Junior Physicist, Ballistic Research Lab., Aberdeen Proving Ground, Md.
MILNE, Prof. W. E., Ph.D. (Harvard) Head of Dept., Oregon State Coll., Corvallis, Ore. *525 N. 21st St.*
MILO, GASPERINE, B.S. (New River State Coll.) *In Service*
MILOS, J. F., A.M. (Columbia) Teacher, Memorial High School, Pelham, N.Y. *Lt. (j.g.), U.S.N.R., U. S. Naval Acad., Annapolis, Md. Dept. of Math.*
MIRICK, G. R., A.M. (Michigan; Columbia) Asst. Dir., Div. of Teachers College Schools, Horace Mann-Lincoln School, 425 West 123 St., New York, N.Y.
MISER, H. J., M.S. (Ill. Inst. of Tech.) Instr., Illinois Inst. of Tech., 3300 Federal St., Chicago, Ill.
MISER, NELLIE P. (Mrs. W. L.), A. B. (Huron Coll.) 1702 Cedar Lane, Nashville, Tenn.
MISER, Prof. W. L., Ph.D. (Chicago) Vanderbilt Univ., Nashville, Tenn. *1702 Cedar Lane*
MITCHELL, Asst. Prof. A. K., Ph.D. (Johns Hopkins) Trinity Coll., Hartford, Conn. *56 LeMay St., West Hartford 7, Conn.*
MITCHELL, Prof. B. E., Ph.D. (Columbia) Millsaps Coll., Jackson, Miss.
MODE, Prof. E. B., A.M. (Harvard) Boston Univ., Boston, Mass. *9 Longmeadow Road, Wellesley, Mass.*
MOELLER, A. C., B.S. (Western Reserve) Instr., Denison Univ., Granville, Ohio. *Box 272*
MOELLER, E. L., B.S. (St. Ambrose) *In Service*
MOLINA, E. C. Scientific Staff, N.D.R.C., New York, N.Y. *141 Dodd St., East Orange, N.J.*
MONASTERIO, Asst. Prof. J. O., C.E. (Chapultepec Milit. Acad.) Loyola Univ., New Orleans 15, La.
MONTAGUE, Asst. Prof. HARRIET F., Ph.D. (Cornell) Univ. of Buffalo, Buffalo 14, N.Y.
MONTGOMERY, Prof. DEANE, Ph.D. (Iowa) Smith Coll., Northampton, Mass. *Visiting Asso. Prof., Princeton Univ., Princeton, N.J. Fine Hall*
MOODY, Prof. W. A., A.M. (Bowdoin) Emeritus, Bowdoin Coll., Brunswick, Me. *60 Federal St.*
MOON, Asso. Prof. PARRY, M.S. (Mass. Inst. of Tech.) Massachusetts Inst. of Tech., Cambridge, Mass.
MOORE, Asst. Prof. B. C., A.M. (Princeton) A. and M. Coll. of Texas, College Station, Tex. *Lt., U.S.N.R.*
MOORE, Prof. C. N., Ph.D. (Harvard) Dir., Grad. studies in math., Univ. of Cincinnati, Cincinnati, Ohio. *219 Woolper Ave.*
MOORE, D. C., A.M. (Emory) Instr., Emory Jr. Coll., Oxford, Ga.
MOORE, Prof. F. C., A.B. (Dartmouth) Massachusetts State Coll., Amherst, Mass.
MOORE, Asst. Prof. G. E., Ph.D. (Illinois) Univ. of Illinois, Urbana, Ill. *55 East Chalmers St., Champaign, Ill.*
MOORE, LILLIAN, Ed.D. (New York Univ.) Teacher, Far Rockaway High School, New York, N.Y. *885 N. 28th St., Philadelphia, Pa.*
MOORE, Asso. Prof. L. T., Ph.D. (Johns Hopkins) Brooklyn Coll., Brooklyn, N.Y. *205 Hicks St.*
MOORE, Asst. Prof. M. G., Ph.D. (Illinois) Bradley Poly. Inst., Peoria, Ill. *530 W. Melbourne*
MOORE, Prof. R. L., Ph.D. (Chicago) Univ. of Texas, Austin, Tex.
MOORE, Asst. Prof. T. W., Ph.D. (Yale) U. S. Naval Acad., Annapolis, Md.
MOORE, Prof. W. A., A.M. (Chicago) Birmingham-Southern Coll., Birmingham, Ala.
MOORE, Asso. Prof. W. L., Ph.D. (Illinois) Univ. of Louisville, Louisville, Ky. *R.F.D. 1, Box 428, Coral Ridge, Ky.*
MOORMAN, Asst. Prof. R. H., Ph.D. (Peabody) Tennessee Poly. Inst., Cookeville, Tenn.
MOOTS, Prof. E. E., Ph.D. (Iowa) Cornell Coll., Mt. Vernon, Iowa. *On leave. 2938 N. Seventh Ave., Phoenix, Ariz.*
MORAN, C. W., Ph.D. (Illinois) Teacher, Lane Tech. School, Chicago, Ill. *2950 Jarlath Ave.*
MORENO, Prof. JENARO, Grad. (Inst. Pedag.) Inst. Pedagogico, Santiago, Chile
MORENUS, Prof. EUGENIE M., Ph.D. (Columbia) Sweet Briar Coll., Sweet Briar, Va.
MORGAN, AGNES L., A.M. (Columbia) Teacher, Brackenridge High School, San Antonio, Tex. *1430 W. Ashby Place, San Antonio 1, Tex.*
MORGAN, F. M., Ph.D. (Cornell) Headmaster, Clark School, Hanover, N.H. *Part-time teaching at Dartmouth Coll.*
MORIARTY, M. M. S., A.B. (Holy Cross) Emeritus, High School, Holyoke, Mass. *Petersham, Mass.*
MORLEY, Prof. R. K., Ph.D. (Clark) Worcester Poly. Inst., Worcester, Mass. *43 Laconia Road*
MORREL, Asst. Prof. J. S., Ph.D. (Illinois) Vanderbilt Univ., Nashville, Tenn. *Lt., U.S.N.R. University Club, Philadelphia, Pa.*
MORRILL, W. K., Ph.D. (Johns Hopkins) Asso., Johns Hopkins Univ., Baltimore, Md.
MORRIS, Prof. C. C., A.M. (Harvard) Ohio State Univ., Columbus, Ohio

MORRIS, Prof. F. R., Ph.D. (California) Head of Dept., Math. and Eng., Fresno State Coll., Fresno, Calif.
MORRIS, Asso. Prof. MAX, Ph.D. (Chicago) Case School of Appl. Sci., Cleveland, Ohio
MORRIS, Prof. RICHARD, Ph.D. (Cornell) Rutgers Univ., New Brunswick, N.J. *12 Johnson St., Highland Park, N.J.*
MORRISON, Sister CHARLES MARY, Ph.D. (Catholic Univ.) Prof., Head of Dept., Nazareth Coll., Louisville, Ky. *851 S. Fourth St.*
MORROW, Asso. Prof. D. C., Ph.D. (Chicago) Wayne Univ., Detroit 1, Mich.
MORSE, Prof. D. S., Ph.D. (Cornell) Union Coll., Schenectady 8, N.Y.
MORSE, Prof. MARSTON, Ph.D. (Harvard) Inst. for Advanced Study, Princeton, N.J. *Tech. Consultant, Office of Chief of Ordnance*
MORSE, W. P., A.M. (Maine) Dean, Ricker Jr. Coll., Houlton, Me. *Lt., U.S.N.R.*
MOSES, IRMA R., A.B. (Cornell) Grad. Asst., Cornell Univ., Ithaca, N.Y. *White Hall*
MOSESSON, Z. I., Ph.D. (Harvard) Prudential Ins. Co. of America, Newark, N.J. *Warrant Officer (j.g.), A.U.S. P.O. Box 192, Ft. Monroe, Va.*
MOSKOVITZ, Asst. Prof. DAVID, Ph.D. (Brown) Carnegie Inst. of Tech., Pittsburgh, Pa.
MOSSMAN, Asst. Prof. THIRZA A., A.M. (Chicago) Kansas State Coll., Manhattan, Kans.
MOSTELLER, F. C., M.S. (Carnegie Inst. of Tech.), A.M. (Princeton) Instr., Princeton Univ., Princeton, N.J. *26 Bank St.*
MOSTON, Prof. L. T., Ph.D. (Harvard) Dean, Waynesburg Coll., Waynesburg, Pa. *498 Second Ave.*
MOULTON, Prof. E. J., Ph.D. (Chicago) Northwestern Univ., Evanston, Ill. *Div. of War Research, Applied Math. Panel. Dogwood Lane, Tenafly, N.J.*
MOULTON, F. R., Ph.D. (Chicago) Permanent Sec'y, A.A.A.S., Washington, D.C. *Smithsonian Institution Bldg.*
MOURSUND, Prof. A. F., Ph.D. (Brown) Univ. of Oregon, Eugene, Ore.
MOUZON, Prof. E. D., Jr., Ph.D. (Illinois) Head of Dept., Southern Methodist Univ., Dallas, Tex.
MOYE, Asst. Prof. W. B., M.S. (Mercer Univ.) Georgia Teachers Coll., Collegeboro, Ga.
MUEHLMANN, Rev. PAUL, A.M. (St. Louis Univ.) Prof., West Baden Coll., West Baden Springs, Ind.
MUGGLI, ETHEL C., A.M. (North Dakota) 4514-16th Ave. N.E., Seattle 5, Wash.
MULLAN, C. E., A.M. (Duquesne) Senior Engr., Duquesne Light Co., Pittsburgh, Pa. *435 Sixth Ave., Pittsburgh 19, Pa.*
MULLEMEISTER, Asst. Prof. HERMANCE, Ph.D. (Utrecht, Holland) Univ. of Washington, Seattle 5, Wash. *1900 E. 68th St.*
MULLINGS, Prof. M. E., Ph.D. (Cincinnati) Head of Dept., Abilene Christian Coll., Abilene, Tex.
MULLINS, Prof. G. W., Ph.D. (Columbia) Barnard Coll., Columbia Univ., New York, N.Y.
MUNDHJELD, SIGURD, A.B. (Concordia Coll.) Treas., Concordia Coll., Moorehead, Minn.
MUNRO, W. D., A.M. (Minnesota) Instr., Univ. of Minnesota, Minneapolis, Minn. *103 Folwell Hall*
MUNROE, FLORENCE L., A.B. (Wellesley) Head of Dept., Retired, High School, Northampton, Mass. *51 Henshaw Ave.*
MUNSHOWER, Asso. Prof. C. W., Ph.D. (New York Univ.) Colgate Univ., Hamilton, N. Y.
MURNAGHAN, Prof. F. D., Ph.D. (Johns Hopkins) Johns Hopkins Univ., Baltimore, Md. *6202 Sycamore Road*
MURRAY, Prof. C. A., A.M. (Texas) West Texas State Coll., Canyon, Tex.
MURRAY, Asst. Prof. S. B., M.S. (Chicago) Mississippi State Coll., State College, Miss. *Lt. Col., U. S. Army, Air Corps. 2340 Olive St., Baton Rouge, La.*
MURRAY, V. F., B.S. (St. Andrew's, Scotland) 524 Hudson St., Hoboken, N.J.
MURRAY, Asso. Prof. W. R., M.S. (Cornell) Franklin and Marshall Coll., Lancaster, Pa.
MUSSELMAN, Prof. J. R., Ph.D. (Johns Hopkins) Chm. of Dept., Western Reserve Univ., Cleveland, Ohio
MYERS, Asso. Prof. W. H., Ph.D. (Stanford) Acting Head of Dept., San Jose State Coll., San Jose, Calif.

NAGLE, J. L. Head Engr., Caribbean Div., Corps of Engineers, U. S. Army. *1669 Michigan Ave., Apt. 2, Miami Beach, Fla.*
NÁPOLES, Prof. G. A., Ph.D. (National Univ., Mexico) Dir., Inst. of Math., National Univ., Tacuba 5, Mexico, D.F., Mexico
NASH, E. E., M.S. (Rensselaer) Instr., Rensselaer Poly. Inst., Troy, N.Y. *Averill Park, N.Y.*
NASH, F. P., A.M. (Columbia) Teacher, Groton School, Groton, Mass.
NASSAU, Prof. J. J., Ph.D. (Syracuse) Astr., Case School of Appl. Sci., Cleveland 6, Ohio
NEELLEY, Prof. J. H., Ph.D. (Yale) Carnegie Inst. of Tech., Pittsburgh, Pa. *300 Broadmoor Ave., Pittsburgh 16, Pa.*

NEFF, Prof. I. F., M.S. (Chicago) Head of Dept., Drake Univ., Des Moines, Iowa. *2801 Brattleboro Ave.*
NEHRBAS, C. J., A.B. (C.C.N.Y.) 20 Pine St., New York, N.Y.
NEISIUS, W. V., B.S. Ch.E. (Georgia Tech.) Instr., Georgia School of Tech., Atlanta, Ga. *Box 2131 Georgia Tech.*
NELSON, Prof. A. L., Ph.D. (Chicago) Chm. of Dept., Wayne Univ., Detroit 1, Mich.
NELSON, Prof. C. A., Ph.D. (Chicago) New Jersey Coll. for Women, Rutgers Univ., New Brunswick, N.J.
NELSON, H. E., Ph.M. (Wisconsin) Instr., Gustavus Adolphus Coll., St. Peter, Minn. *1024 S. Fifth St.*
NELSON, Q. E. Student, Univ. of Texas, Austin, Tex. *216 E. 26th St.*
NELSON, Prof. SARA L., Ph.D. (Cornell) Asst. Registrar, Head of Dept., Georgia State Coll. for Women, Milledgeville, Ga. *512 N. Columbia St.*
NELSON, Asso. Prof. W. K., M.S., E.E. (Colorado) Engg. Math., Univ. of Colorado, Boulder, Colo. *925 Grandview Ave.*
NESS, MARIE M., A.M. (Minnesota) Research Asso., Univ. of Minnesota, Minneapolis, Minn. *2530 Dupont Ave. S.*
NEUBAUER, Asst. Prof. GRETA, A.M. (Wyoming) Univ. of Wyoming, Laramie, Wyo. *Engineering Bldg.*
NEVINS, W. V., III, A.M. (Columbia) Instr., Alfred Univ., Alfred, N.Y. *Box 33*
NEWLIN, RUTH, A.M. (Wisconsin) Teacher, Creston Jr. Coll. and High School, Creston, Iowa
NEWMAN, NATHAN, B.S. (C.C.N.Y.) Jr. Physicist, National Bureau of Standards, Washington, D.C. *62 East 183 St., Bronx 53, N.Y.*
NEWMAN, PHILIP, Ph.D. (Columbia) Address unknown
NEWSOM, Prof. C. V., Ph.D. (Michigan) Univ. of New Mexico, Albuquerque, N.M.
NEWSON, Prof. MARY W., Ph.D. (Göttingen) Emeritus, Eureka Coll., Eureka, Ill. *Lake Dalecarlia, Lowell, Ind.*
NEWTON, Asst. Prof. ABBA V., Ph.D. (Chicago) Smith Coll., Northampton, Mass. *69 Belmont Ave.*
NEWTON, Prof. G. A., A.M. (Trinity Univ.) Trinity Univ., San Antonio, Tex. *2206 Cincinnati Ave.*
NICHOLS, Prof. I. C., Ph.D. (Michigan) Louisiana State Univ., University Sta., Baton Rouge, La. *Nicholson Hall*
NICKOL, J. P., Ph.D. (Fribourg) Dean of Sci., Siena Coll., Loudonville, N.Y. *Box 837, Maxwell Road, Newtonville, N.Y.*
NICOLET, JUSTIN. Structural Engr., Dept. of Subways and Highways, Chicago, Ill. *4148 N. Paulina St.*
NIERSBACH, P. M., A.M. (Southern California) Teacher, High School, Bell, Calif. *6925 Passaic St., Huntington Park, Calif.*
NIVEN, Asst. Prof. IVAN, Ph.D. (Chicago) Purdue Univ., Lafayette, Ind. *Dept. of Math.*
NOBLE, Prof. C. A., Ph.D. (Göttingen) Emeritus, Univ. of California, Berkeley, Calif. *2224 Piedmont Ave.*
NORDGAARD, Prof. M. A., Ph.D. (Columbia) Head of Dept., Upsala Coll., East Orange, N.J.
NORDHAUS, Asst. Prof. E. A., Ph.D. (Chicago) Michigan State Coll., East Lansing, Mich.
NORDSTROM, C. H., A.M. (Lehigh) Instr., Dartmouth Coll., Hanover, N.H. *9 College St.*
NORMAN, P. B., A.M. (California) Instr., New York Univ., New York 53, N.Y.
NORRIS, Prof. R. E., A.M. (Illinois) Head of Dept., State Teachers Coll., Milwaukee, Wis.
NORTHROP, Asst. Prof. E. P., Ph.D. (Yale) Univ. of Chicago, Chicago, Ill. *5464 Cornell Ave.*
NOTLEY, LLEWELLYN, A.M. (Texas) Supt. of Schools, Teague, Tex. *P.O. Box 830*
NOVAK, J. D., M.S. (Chicago) Head of Dept., Math. and Physics, MacMurray Coll., Jacksonville, Ill.
NOWLAN, Prof. F. S., Ph.D. (Chicago) Univ. of British Columbia, Vancouver, B.C., Can.
NOWLAN, MABEL I., M.S. (Michigan) Clerk, War Dept., Washington, D.C. *5810 N.W. First Place, Miami 38, Fla.*
NYSWANDER, Asso. Prof. J. A., Ph.D. (Chicago) Univ. of Michigan, Ann Arbor, Mich.

OAKLAND, G. B., A.M. (Minnesota) Teacher, Scott Collegiate Inst., Regina, Sask., Can.
OAKLEY, Prof. C. O., Ph.D. (Illinois) Haverford Coll., Haverford, Pa.
OBERG, E. N., Ph.D. (Minnesota) Instr., Univ. of Iowa, Iowa City, Iowa. *Physics Bldg.*
OBRIST, Sister JEANETTE, Ph.D. (Catholic Univ.) Instr., Mount St. Scholastica Coll., Atchison, Kans.
O'CALLAHAN, J. T., A.M. (Boston Coll.) *In Service*
O'CONNOR, H. J., M.A. (Toronto) Instr., Niagara Univ., Niagara University, N.Y. *1016 Cleveland Ave., Niagara Falls, N.Y.*
O'DONNELL, Rev. G. A., Ph.D. (St. Louis Univ.) Prof., Dean of Grad. School, Boston Coll., Chestnut Hill, Mass.

OEHLER, Prof. CHRISTIAN, A.M. (Columbia) Accounting, Fordham Univ.; Armstrong and Oehler, Cert. Pub. Accountants, 92 Liberty St., New York, N.Y.
OERGEL, C. T., B.S. in M.E. (Pennsylvania State) Test Engr., General Electric Co., Lynn, Mass. *135 Marble St., Stoneham, Mass.*
OGAWA, GEORGE, A.M. (State Coll. of Washington) Asst., State Coll. of Washington, Pullman, Wash. *Route 1*
OGDEN, Prof. E. B., Ph.D. (Boston Univ.) Head of Dept., Union Coll., Lincoln, Nebr. *Part-time, STAR program, Univ. of Nebraska. 4626 Bancroft St., Lincoln, Nebr.*
OGLESBY, Prof. E. J., A.M. (Virginia) Eng. Math., Univ. of Virginia, University, Va. *P.O. Box 1032*
O'HARA, Rev. C. W. Prof., Math. and Physics, Heythrop Coll., Chipping Norton, Oxon, England
OLDENBURGER, Prof. RUFUS, Ph.D. (Chicago) Illinois Inst. of Tech., 3300 Federal St., Chicago, Ill. *1635 E. Hyde Park Blvd., Chicago 15, Ill.*
OLDS, Asso. Prof. E. G., Ph.D. (Pittsburgh) Carnegie Inst. of Tech., Pittsburgh, Pa. *222 Gladstone Road, Pittsburgh 17, Pa.*
O'LEARY, Asst. Prof. A. J., M.S. (Catholic Univ.) Chm. of Dept., St. Anselm's Coll., Manchester, N.H. *Chaplain, U. S. Army (Captain)*
OLLIVIER, Asst. Prof. ARTHUR, Ph.D. (Iowa) Mississippi State Coll., State College, Miss. *Dept. of Math.*
OLLMANN, Asso. Prof. L. F., Ph.D. (Michigan) Head of Dept., Hofstra Coll., Hempstead, N.Y.
OLMSTED, Asst. Prof. J. M. H., Ph.D. (Princeton) Univ. of Minnesota, Minneapolis, Minn. *Dept. of Math.*
OLMSTED, Asso. Prof. MARGARET, A.M. (Illinois) Latin and Math., Augustana Coll., Rock Island, Ill. *330-19th St.*
OLPIN, J. L., M.S. (Colorado) Instr., Chm. Sci. Comte, Gila Jr. Coll., Thatcher, Ariz.
OLSON, Asst. Prof. EMMA J., Ph.D. (Chicago) Kent State Univ., Kent, Ohio. *537 S. Lincoln St.*
OLSON, F. C. W., B.S. (Chicago) Box 363, Route 1, Glenview, Ill.
OLSON, Asst. Prof. H. L., Ph.D. (Chicago) Southwestern Univ., Georgetown, Tex. *1017 College St.*
OPATOWSKI, ISAAC, D.Eng. (R. Inst. of Engg., Turin), D.Math. (R. Univ., Turin) Armour Research Foundation, Illinois Inst. of Tech., 35 West 33 St., Chicago, Ill.
OPPENHEIM, Prof. ALEXANDER, B.A. (Oxon), Ph.D. (Chicago) Raffles Coll., Singapore, Straits Settlements
O'QUINN, Asso. Prof. R. L., Ph.D. (Peabody) Louisiana State Univ., University Sta., Baton Rouge, La.
ORANGE, WILLIAM, A.M. (California) Chm. of Dept., Los Angeles City Coll., 855 N. Vermont Ave., Los Angeles, Calif.
ORE, Prof. OYSTEIN, Ph.D. (Oslo) Yale Univ., New Haven, Conn.
O'SHAUGHNESSY, Prof. LOUIS, Ph.D. (Pennsylvania) Applied Mech., Dir. of Grad. Studies, Virginia Poly. Inst., Blacksburg, Va. *Box 93*
O'TOOLE, A. L., Ph.D. (Michigan) *Lt., U.S.N.R.*
OTT, Asst. Prof. E. R., Ph.D. (Illinois) Univ. of Buffalo, Buffalo, N.Y. *20 Nicholson St.*
OTT, Prof. W. P., Ph.D. (Chicago) Head of Dept., Univ. of Alabama, University, Ala.
OURSLER, C. C., M.S. (Chicago) Teacher, High School, Gary, Ind. *Ensign, U.S.N.R. Cynthiana, Ind.*
OVERMAN, Prof. J. R., Ph.D. (Michigan) Dean of Coll. of Lib. Arts, Bowling Green State Univ., Bowling Green, Ohio
OWENS, Prof. F. W., Ph.D. (Chicago) Head of Dept., Pennsylvania State Coll., State College, Pa. *462 E. Foster Ave.*
OWENS, HELEN B. (Mrs. F. W.), Ph.D. (Cornell) 462 E. Foster Ave., State College, Pa.
OXTOBY, Asso. Prof. J. C., A.M. (California) Bryn Mawr Coll., Bryn Mawr, Pa. *Dalton Hall*

PALL, Asso. Prof. GORDON, Ph.D. (Chicago) McGill Univ., Montreal, P.Q., Can. *Engineering Bldg.*
PALLADINO, JAMES, B.S. (Long Island Univ.) Instr., Physics, Long Island Univ., Brooklyn, N. Y. *498 Graham Ave.*
PALMER, H. A., B.S. (Coll. of Idaho) Instr., Coll. of Idaho, Caldwell, Idaho
PARK, Prof. R. S., Ph.D. (Kentucky) Eastern Kentucky State Teachers Coll., Richmond, Ky. *213 Burnam Court*
PARKER, BOB, A.M. (Texas Tech.) Instr., Texas Tech. Coll., Lubbock, Tex. *2606-28th St.*
PARKER, Prof. W. V., Ph.D. (Brown) Head of Dept., Louisiana State Univ., University Sta., Baton Rouge, La.
PARKINSON, Asso. Prof. G. A., Ph.D. (Wisconsin) Chm. of Dept., Univ. of Wisconsin Exten. Div., 623 W. State St., Milwaukee, Wis. *In Service*

PARRISH, H. C., M.S. (North Texas St. T. C.) Asst., Ohio State Univ., Columbus, Ohio. *79 E. Woodruff Ave.*

PATTEN, W. E., C.E. (Cornell) Asst. Hydraulic Engr., U. S. Geological Survey, Charlottesville, Va. *1401 Main St., South Boston, Va.*

PATTERSON, Prof. B. C., Ph.D. (Johns Hopkins) Hamilton Coll., Clinton, N. Y. *College Hill*

PATTERSON, G. W., A.M. (Columbia) Jr. Physicist, Natl. Hydraulic Lab., Natl. Bureau of Standards, Washington, D.C. *3930 Fourth St. N., Arlington, Va.*

PATTERSON, Asst. Prof. K. B., A.M. (Princeton) Duke Univ., Durham, N.C. *1024 Monmouth Ave.*

PATTERSON, Asst. Prof. W. A., Ph.D. (Ohio State) Fenn Coll., Cleveland, Ohio. *R.D. 1, Riverbend Road, Willoughby, Ohio*

PAWLEY, M. G., Ph.D. (Cornell) Radio Engr., Naval Research Lab., Washington, D.C. *503 Fontaine St., Alexandria, Va.*

PAXTON, Asso. Prof. E. K., A.M. (Columbia) Washington and Lee Univ., Lexington, Va. *P. O. Box 754*

PAYDON, J. F., Ph.D. (Northwestern) *Lt. (j.g.), U.S.N.R. c/o J. S. Paydon, Plainfield, Ill.*

PAYNE, Asst. Prof. C. K., Ph.D. (New York Univ.) Washington Square Coll., 100 Washington Sq. E., New York, N.Y. *24 Valley Road, Butler, N.J.*

PEASE, D. K. *T/Sgt., Photo Lab. Chief, Army Air Base, Statesboro, Ga. 261 Ridgewood Road, West Hartford, Conn.*

PEEBLES, N. A. Statistical clerk, Office of President, Atlantic Coast Line RR Co., Wilmington, N.C. *20 N. Eighth St.*

PEGRAM, Prof. ANNIE M., A.M. (Duke) Greensboro Coll., Greensboro, N.C.

PEHRSON, Prof. E. W., A.M. (California) Univ. of Utah, Salt Lake City 5, Utah

PEISER, A. M., A.M. (Cornell) Instr., Cornell Univ., Ithaca, N.Y. *Dept. of Math.*

PELLETIER, Prof. ARTHUR. Emerité, Higher Alg., École Poly., Montreal, P.Q., Can. *8456 Drolet St.*

PENCE, Asst. Prof. SALLIE E., Ph.D. (Illinois) Univ. of Kentucky, Lexington, Ky. *635 Maxwelton Ct.*

PENNELL, W. O., B.S. (Mass. Inst. of Tech.) Chief Engr., Retired, Southwestern Bell Tel. Co., St. Louis, Mo. *69 Court St., Exeter, N.H.*

PENNY, WALTER. Jr. Cryptanalyst, Navy Dept., Washington, D.C. *1819 F Street N.W.*

PEPPER, ECHO D., Ph.D. (Chicago) Asso., Univ. of Illinois, Urbana, Ill. *353 Math. Bldg.*

PEPPER, Asso. Prof. P. M., Ph.D. (Cincinnati) Univ. of Notre Dame, Notre Dame, Ind. *Dept. of Math.*

PEPPER, R. I., A.M. (Columbia) Instr., Univ. of Tennessee, Knoxville, Tenn. *Box 4081 U. T. Sta.*

PERKINS, Asso. Prof. F. W., Ph.D. (Harvard) Dartmouth Coll., Hanover, N.H. *8 Prospect St.*

PERKINS, Prof. H. A., A.M. (Wisconsin) Hampton Inst., Hampton, Va. *Lt., U.S.N.R., Subchaser Training Center, Miami, Fla.*

PERKINS, Prof. L. R., A.M. (Tufts) Emeritus, Middlebury Coll., Middlebury, Vt. *12 Hillcrest Road*

PERLIN, I. E., Ph.D. (Chicago) Instr., Illinois Inst. of Tech., Chicago, Ill. *Lt., U.S.N.R., Midshipmen's School, New York, N.Y. 925 West End Ave.*

PERRY, C. W., B.S. (McGill) Clerk, Sun Life Assur. Co. of Canada, Montreal, P.Q., Can. *In Service*

PERRY, D. B., A.M. (Stanford) *Lt. (j.g.), U.S.N.R. 14321 Valerio St., Van Nuys, Calif.*

PETERHANS, Prof. W. A. Visual Training, Illinois Inst. of Tech., Chicago, Ill. *4933 Dorchester Ave.*

PETERS, A. S., Ph.D. (New York Univ.) Instr., New York Univ., University Heights, New York, N.Y. *Ballistician, War Dept., Research Lab., Bel Air, Md. R.F.D. 2, Box 20A*

PETERS, I. D., M.S. (West Virginia) Instr., West Virginia Univ., Morgantown, W.Va. *P. O. Box 554*

PETERS, J. W., Ph.D. (Johns Hopkins) Instr., Univ. of Illinois, Urbana, Ill. *253 Math. Bldg.*

PETERS, MAX, M.S. (C.C.N.Y.) Teacher, New Utrecht High School, Brooklyn, N.Y. *845 West End Ave., New York, N.Y.*

PETERS, Prof. RUTH M., Ph.D. (Radcliffe) Math. and Physics, Lake Erie Coll., Painesville, Ohio. *Research mathematician, N.D.R.C., Massachusetts Inst. of Tech., Cambridge, Mass. 27 Pinehurst Road, Belmont, Mass.*

PETERSEN, J. S., Jr., M.S. (St. Louis Univ.) *Office of Chief Signal Officer, Washington, D.C. 1819 G Street N.W.*

PETERSON, J. K., A.M. (Harvard) Instr., Lawrence Inst. of Tech., Highland Park, Mich. *Coll. of Engineering*

PETERSON, Prof. O. J., Ph.D. (Michigan) State Teachers Coll., Emporia, Kans. *1417 West St.*

PETERSON, Asst. Prof. T. S., Ph.D. (Ohio State) Univ. of Oregon, Eugene, Ore. *Physicist, Bureau of Ordnance, U. S. Navy. 2628-30th Ave. W., Seattle 99, Wash.*

PETRIE, G. W. III, M.S. (Carnegie Inst.) *Lt., U.S.N.R. 613 Washington Ave., Oakmont, Pa.*

PETTIS, B. J., Ph.D. (Virginia) *2nd Lt., U. S. Army. Box 673, Spartanburg, S.C.*

PETTIS, C. R., Ph.D. (Michigan) Head of Dept., Mississippi State Coll., State College, Miss. *Col., Engineers, R.O.T.C., Ohio State Univ., Columbus, Ohio. 1980 Suffolk Rd., Columbus 8, Ohio*

PETTIT, Prof. H. P., Ph.D. (Illinois) Head of Dept., Marquette Univ., Milwaukee, Wis. *Waterford, Wis.*

PFLAUM, C. W., A.B. (Michigan) Instr., Univ. of Pennsylvania, Philadelphia, Pa. *Dept. of Math.*

PHALEN, Asso. Prof. H. R., Ph.D. (Chicago) Coll. of William and Mary, Williamsburg, Va.

PHELPS, C. R., Ph.D. (Harvard) *Lt. (j.g.), U.S.N.R., U. S. Naval Acad., Annapolis, Md. Dept. of Math.*

PHILLIPS, Rev. E. C., Ph.D. (Johns Hopkins) Asst. to Provincial Superior, New York Province of the Society of Jesus, 501 E. Fordham Rd., New York 58, N.Y.

PHILLIPS, E. J., M.S. in Educ. (Oklahoma) Instr., Univ. of San Francisco, San Francisco, Calif. *460 Garden St., Palo Alto, Calif.*

PHIPPS, Prof. C. G., Ph.D. (Minnesota) Univ. of Florida, Gainesville, Fla. *Box 2132 Univ. Sta.*

PIERCE, Asst. Prof. JESSE, Ph.D. (Michigan) Case School of Appl. Sci., Cleveland, Ohio. *2639 Hampshire Road, Cleveland Heights, Ohio.*

PIERSON, A. D., A.M. (Missouri) Jr. Coll., Kansas City, Mo. *7217 Summit Ave.*

PINKERTON, Asso. Prof. R. M., B.S. (Bradley Poly. Inst.) Aero. Engg., A. and M. Coll. of Texas, College Station, Tex. *Aero. Dept.*

PIRANIAN, GEORGE, Ph.D. (Rice) Asst. Research Mathematician, N.D.R.C., Columbia Univ., New York, N.Y. *401 West 118 St., New York 27, N.Y.*

PITCHER, Asst. Prof. A. E., Ph.D. (Harvard) Lehigh Univ., Bethlehem, Pa. *1st Lt., A.U.S., Ordnance. 422 W. Broad St., Bethlehem, Pa.*

PITTS, Asst. Prof. R. J., A.M. (Michigan) Fort Valley State Coll., Fort Valley, Ga.

PIXLEY, Asso. Prof. H. H., Ph.D. (Chicago) Wayne Univ., Detroit 1, Mich.

PLANT, Prof. L. C., M.S. (Chicago) Emeritus, Michigan State Coll., East Lansing, Mich. *231 Oakhill Ave.*

PLOENGES, Asso. Prof. E. W., A.M. (Michigan) James Millikin Univ., Decatur, Ill. *317 Linden Pl.*

PODMELE, THERESA L., A.M. (Buffalo) Teacher, East High School, Buffalo, N.Y. *356 Lisbon Ave.*

POLAN, Asst. Prof. L. R., M.S. (West Virginia) Alfred Univ., Alfred, N. Y.

POLLARD, Asso. Prof. H. S., Ph.D. (Wisconsin) Miami Univ., Oxford, Ohio. *350 Patterson Ave.*

POLLARD, Prof. W. G., Ph.D. (Rice) Physics, Univ. of Tennessee, Knoxville, Tenn. *Dept. of Physics*

POLLEY, Prof. J. C., Ph.D. (Cornell) Wabash Coll., Crawfordsville, Ind.

POLYA, Asso. Prof. GEORGE, Ph.D. (Budapest) Stanford Univ., Stanford University, Calif. *660 Dartmouth St., Palo Alto, Calif.*

POOLE, Asst. Prof. A. R., Ph.D. (Calif. Inst. of Tech.) Univ. of Oregon, Eugene, Ore. *Dept. of Math.*

POPPEN, Asst. Prof. H. A., A.M. (Northwestern Univ.) Illinois State Normal Univ., Normal, Ill.

PORITSKY, HILLEL, Ph.D. (Cornell) Genl. Elec. Co., 1 River Road, Schenectady, N.Y.

PORTER, Asso. Prof. D. H., A.M. (Indiana) Math. and Physics, Marion Coll., Marion, Ind. *4105 S. Wigger St.*

PORTER, RUTH E., A.M. (Oregon), M.S. (Oregon State Coll.) Math. and Physics, Grays Harbor Jr. Coll., Aberdeen, Wash. *918 Arnold St.*

POST, Asst. Prof. E. L., Ph.D. (Columbia) Coll. of the City of New York, New York 31, N.Y. *610 West 173 St., New York 32, N.Y.*

POULIOT, Dean ADRIEN, M.A. (Laval) Dean of Faculty of Science, Laval Univ., Blvd. de l'Entente, Quebec, P.Q., Can.

POUND, Prof. V. E., Ph.D. (Toronto) Univ. of Buffalo, Buffalo, N.Y. *190 Capen Blvd.*

POUNDER, Prof. I. R., Ph.D. (Chicago) Univ. of Toronto, Toronto, Ont., Can.

POWELL, Asso. Prof. J. E., Ph.D. (Chicago) Michigan State Coll., East Lansing, Mich. *137 Bogue St.*

PRENOWITZ, Asst. Prof. WALTER, Ph.D. (Columbia) Brooklyn Coll., Bedford Ave. and Avenue H, Brooklyn 10, N.Y.

PRETZ, P. S., A.M. (St. John's Univ.) Head of Dept., St. Benedict's Coll., Atchison, Kans.

PRICE, Prof. G. B., Ph.D. (Harvard) Univ. of Kansas, Lawrence, Kans. *205 Frank Strong Hall*

PRICE, Prof. H. F., Ph.D. (Pennsylvania) Dean, Pacific Univ., Forest Grove, Ore. *303 Second St. S.*

PRICE, Asst. Prof. H. V., Ph.D. (Iowa) Univ. of Iowa; Head of Dept., University High School, Iowa City, Iowa
PRICE, IRENE, Ph.D. (Indiana) Teacher, State Teachers Coll., Oshkosh, Wis.
PRICE, R. W., A.M. (Columbia) Supervising Principal, High School, Picture Rocks, Pa. *R.D. 1, Hughesville, Pa.*
PRIESTER, G. C., Ph.D. (Michigan) Head of Dept., Math. and Mech., Univ. of Minnesota, Minneapolis, Minn.
PRINCE, Prof. VERTIE D., A.M. (Georgia) Flora Macdonald Coll., Red Springs, N.C.
PUCKETT, W. T., Jr., Ph.D. (Virginia) Instr., Univ. of California at Los Angeles, Los Angeles, Calif. *Dept. of Math.*
PUGSLEY, Asso. Prof. D. W., M.S. (Michigan) Berea Coll., Berea, Ky. *Box 114, College P.O.*
PURCELL, Asso. Prof. E. J., Ph.D. (Cornell) Univ. of Arizona, Tucson, Ariz. *Route 5, Box 738*
PURDIE, Asso. Prof. K. S., B.S. (Va. Milit. Inst.) Virginia Military Inst., Lexington, Va.
PURVIANCE, R. A., A.B. (Wabash) Instr., Univ. of Tennessee, Knoxville, Tenn. *1st Lt., A.A.F.*
PUTNAM, A. L., Ph.D. (Harvard) Instr., Yale Univ., New Haven, Conn. *781 Yale Station*
PUTNAM, Asso. Prof. R. G., Ph.D. (Chicago) New York Univ., New York, N.Y. *115 Riverview Ave., Tarrytown, N.Y.*
PYKE, Prof. A. J. Univ. of Saskatchewan, Saskatoon, Sask., Can.
PYLE, Prof. H. R., Ph.D. (California) Whittier Coll., Whittier, Calif. *530 N. Bright St.*

QUAID, L. J., B.S. (Illinois) Instr., Drawing, Univ. of Minnesota, Minneapolis, Minn. *322-18th Ave. S.E.*
QUARLES, Asst. Prof. H. L., A.M. (Alabama) Univ. of Mississippi, University, Miss. *Maj., Inf., U. S. Army*
QUERRY, Prof. J. W., Ph.D. (Iowa) Head of Dept., Sam Houston State Teachers Coll., Huntsville, Tex. *Capt., A.U.S., Air Corps*
QUILLIAM, V. V., A.M. (U.C.L.A.) Accountant, Firestone Tire and Rubber Co., Los Angeles, Calif. *3771 May St., Venice, Calif.*
QUILTY, PATRICK, C.E. (Cooper Union) Commissioner, Dept. of Water Supply, Gas and Elec., Municipal Bldg., New York, N.Y. *884 Riverside Drive, New York 32, N.Y.*
QUINN, GRACE SHOVER (Mrs. R. B.), Ph.D. (Ohio State) Asso., George Washington Univ., Washington, D.C. *3221 Wheeler Rd. S.E., Apt. 201, Washington 20, D.C.*

RADER, M. A., A.M. (Lehigh) Instr., Moravian Coll. and Theolog. Sem., Bethlehem, Pa.
RADÓ, Prof. TIBOR, Ph.D. (Szeged) Ohio State Univ., Columbus, Ohio. *92 Walhalla Rd., Columbus 2, Ohio*
RAHN, EDRIS P., A.M. (California) Teacher, Union High School, Hayward, Calif. *1456 Glen Drive, San Leandro, Calif.*
RAINE, P. W. A., A.M. (Virginia) Teacher, High School, Newport News, Va. *106 Galax St., Hampton, Va.*
RAINICH, Prof. G. Y., Master in Pure Math. (Kazan) Univ. of Michigan, Ann Arbor, Mich. *602 Oswego St.*
RAINVILLE, Asst. Prof. E. D., Ph.D. (Michigan) Univ. of Michigan, Ann Arbor, Mich. *1459 Rosewood St., R.F.D. 7*
RAMBO, Prof. SUSAN M., Ph.D. (Michigan) Smith Coll., Northampton, Mass. *12 Barrett Pl.*
RAMLER, Prof. O. J., Ph.D. (Catholic Univ.) Catholic Univ. of America, Washington, D.C. *12 Girard St. N.E., Washington 2, D.C.*
RAMSDELL, Prof. G. E., A.M. (Harvard) Bates Coll., Lewiston, Me. *40 Mountain Ave.*
RAMSEY, Asst. Prof. L. W., B.S. (A. and M. Coll. of Texas) Math. and Engg., Texas Christian Univ., Fort Worth 9, Tex. *Box 441, T.C.U.*
RAMSEY, MARGARET, A.M. (Oregon) Instr., Linfield Coll., McMinnville, Ore.
RANDALL, Prof. A. W., A.M. (Colorado) Head of Dept., Prairie View State Coll., Prairie View, Tex. *Box 63*
RANDELS, W. C., Ph.D. (Brown) Physicist, North American Aircraft Corp., Inglewood, Calif. *6009 Mansfield St., Los Angeles, Calif.*
RANDOLPH, Prof. J. F., Ph.D. (Cornell) Oberlin Coll., Oberlin, Ohio.
RANKIN, Prof. J. M., A.M. (California) Coll. of Idaho, Caldwell, Idaho. *1810 Ash St.*
RANKIN, Prof. W. W., A.M. (North Carolina) Duke Univ., Durham, N.C.
RANSOM, Prof. W. R., A.M. (Tufts; Harvard) Tufts Coll., Medford, Mass. *29 Sawyer Ave.*
RASMUSEN, RUTH B., Ph.D. (Chicago) Instr., Wilson Jr. Coll., Chicago, Ill.
RASOR, E. A., M.S. (Ohio State) *Lt. (j.g.), U.S.N.R.*
RASOR, Prof. S. E., M.S. (Chicago) Ohio State Univ., Columbus, Ohio. *1594 Neil Ave.*
RAUCH, L. L., A.B. (Southern California) Instr., Princeton Univ., Princeton, N.J. *Dept. of Math.*
RAUCH, L. M., Ph.D. (California) Head of Dept., Seton Hall Coll., South Orange, N.J. *In Service*

RAUDENBUSH, Asst. Prof. H. W., Ph.D. (Columbia) Queens Coll., Flushing, N.Y. *84-41 169 St., Jamaica, N.Y.*

RAWLINS, Prof. C. H., Jr., Ph.D. (Johns Hopkins) Postgraduate School, U. S. Naval Acad., Annapolis, Md. *13 Franklin St.*

RAYHER, EDWARD, A.M. (Columbia) Teacher, Somerset School, North Plainfield, N.J. *415 Central Park West, New York 25, N.Y.*

RAYL, Asst. Prof. ADRIENNE S., Ph.D. (Chicago) Univ. of Alabama Center, Birmingham, Ala. *1214 N. 32nd St.*

RAYNOR, Asso. Prof. G. E., Ph.D. (Princeton) Lehigh Univ., Bethlehem, Pa. *530 Tenth Ave.*

READ, Prof. C. B., Ph.D. (Colo. State Coll. of Educ.) Head of Dept., Univ. of Wichita, Wichita 6, Kans.

READE, MAXWELL, Ph.D. (Rice) Instr., Purdue Univ., Lafayette, Ind.

REAGAN, Prof. C. A., A.M. (Kansas) Friends Univ., Wichita, Kans. *Part-time, Army Training Program, Univ. of Wichita*

REAGAN, Asst. Prof. L. M., A.M. (Kansas) Poly. Inst. of Brooklyn, 99 Livingston St., Brooklyn 2, N.Y.

REAVES, Prof. CAROLINE M., A.M. (Oklahoma) Coker Coll., Hartsville, S.C.

REAVES, Prof. S. W., Ph.D. (Chicago) Univ. of Oklahoma, Norman, Okla.

REBARKER, Prof. HERBERT, Ph.D. (Peabody) East Carolina Teachers Coll., Greenville, N.C.

RECHARD, Prof. O. H., Ph.D. (Wisconsin) Chm. of Dept., Univ. of Wyoming, Laramie, Wyo.

RECHT, Asso. Prof. A. W., Ph.D. (Chicago) Math. and Astr., Univ. of Denver, Denver, Colo. *2233 S. St. Paul St.*

RECKZEH, J. K., A.M. (Kentucky) Instr., West Virginia Inst. of Tech., Montgomery, W.Va. *Ensign, U.S.N.R.*

REDDEN, Asso. Prof. J. E., M.S. (Iowa State) John Tarleton Agric. Coll., Stephenville, Tex. *Box 246, Tarleton Sta.*

REDDICK, Adj. Prof. H. W., Ph.D. (Columbia) New York Univ., University Heights, New York, N.Y. *Box 205, N.Y.U.*

REECE, Pres. R. H., A.M. (Colorado) New Mexico School of Mines, Socorro, N.M.

REED, Prof. F. W., Ph.D. (Virginia) Ohio Univ., Athens, Ohio. *61 Columbia Ave.*

REED, Prof. L. J., Ph.D. (Pennsylvania) Biostatistics, Dean of School of Hygiene and Public Health, Johns Hopkins Univ., Baltimore 5, Md.

REES, Prof. C. J., Ph.D. (Pennsylvania) Head of Dept., Math. and Astr., Univ. of Delaware, Newark, Del. *230 E. Main St.*

REES, Asso. Prof. MINA S., Ph.D. (Chicago) Hunter Coll., New York, N.Y. *Principal Tech. Aide, Applied Math. Panel, N.D.R.C. 140 East 40 St., New York 16, N.Y.*

REES, P. K., Ph.D. (Rice) Southwestern Louisiana Inst., Lafayette, La.

REES, W. A., A.M. (Texas) Chm., Div. of Nat. Sci., Univ. of Houston, Houston, Tex. *3025 Amherst St., Houston 5, Tex.*

REEVE, Prof. W. D., Ph.D. (Minnesota) Teachers Coll., Columbia Univ., New York, N.Y. *460 Riverside Drive*

REHBERG, C. F., A.M. (Columbia) Instr., Elec. Eng., New York Univ., New York, N.Y. *25-28 84th St., Jackson Heights, N.Y.*

REIBER, F. A., M.S. (Florida) 2918 Yale Ave., Jacksonville, Fla.

REICHELDERFER, P. V., Ph.D. (Ohio State) *Ensign, U.S.N.R. R. F. D. 1, Box 50, Laurelville, Ohio*

REID, Asst. Prof. W. T., Ph.D. (Texas) Univ. of Chicago, Chicago, Ill. *Box 44, Eckhart Hall*

REILLY, Sister MARY HENRIETTA, Ph.D. (Catholic Univ.) Head of Dept., Teachers Coll., 28 Calhoun St., Cincinnati 19, Ohio. *1409 Freeman Ave., Cincinnati, Ohio*

REINGOLD, Asst. Prof. HAIM, Ph.D. (Cincinnati) Illinois Inst. of Tech., Chicago, Ill. *146 N. Parkside Ave., Chicago 44, Ill.*

REINSCH, Prof. B. P., Ph.D. (Illinois) Head of Dept., Florida Southern Coll., Lakeland, Fla. *191 Lake Morton Drive*

REKLIS, Mrs. VIRGINIA MODESITT, Ph.D. (Illinois) Instr., Wright Jr. Coll., Chicago, Ill. *454 W. Main St., Danville, Ind.*

REMICK, Prof. B. L., Ph.M. (Cornell Coll.) Kansas State Coll., Manhattan, Kans. *613 Houston St.*

RENWICK, ELIZABETH, A.M. (Indiana) Instr., Grove City Coll., Grove City, Pa. *439 S. Broad St.*

REVES, Asst. Prof. G. E., Ph.D. (Cincinnati) The Citadel, Charleston, S.C.

REX, E. C., M.S. (Washington) Visiting Instr., Univ. of Southern California, Los Angeles, Calif. *Box 91, Univ. of S.C.*

REYNOLDS, Prof. C. N., Ph.D. (Harvard) Acting Head of Dept., West Virginia Univ., Morgantown, W.Va. *217 McLane Ave.*

REYNOLDS, Prof. J. B., Ph.D. (Moravian) Math. and Theoret. Mech., Lehigh Univ., Bethlehem, Pa. *721 W. Broad St.*

REYNOLDS, J. O., A.M. (North Carolina) Instr., Univ. of North Carolina, Chapel Hill, N.C. *Lt. (j.g.), U.S.N.R. P.O. Box 386, Chapel Hill, N.C.*
REYNOLDS, LENA E., A.M. (California) Head of Dept., Jr. Coll., Fullerton, Calif.
RHODES, Asst. Prof. C. E., Ph.D. (Cincinnati) Union Coll., Schenectady 8, N.Y.
RHODES, Prof. M. C., Ph.D. (Peabody) Univ. of Tampa, Tampa 6, Fla.
RICE, Prof. HARRIS, A.M. (Harvard) Worcester Poly. Inst., Worcester, Mass.
RICE, Asst. Prof. H. L., M.S. (Iowa) Univ. of Omaha, Omaha, Nebr. *130 Fifth Ave., Council Bluffs, Iowa*
RICE, Asso. Prof. J. N., Ph.D. (Catholic Univ.) Catholic Univ. of America, Washington, D.C. *3326-13th St. N.E., Washington 17, D.C.*
RICE, R. B., A.B. (Wooster) Asst., Ohio State Univ., Columbus, Ohio. *166 W. Lane Ave.*
RICHARDSON, Prof. A. V., M.A. (Cambridge) Bishops Coll., Lennoxville, P.Q., Can.
RICHARDSON, Prof. C. H., Ph.D. (Michigan) Bucknell Univ., Lewisburg, Pa.
RICHARDSON, MOSES, Ph.D. (Columbia) Instr., Brooklyn Coll., Brooklyn, N.Y.
RICHARDSON, Dean R. G. D., Ph.D. (Yale) Grad. School, Brown Univ., Providence, R.I.
RICHERT, Prof. D. H., A.M. (Colorado) Math. and Astr., Bethel Coll., North Newton, Kans.
RICHESON, Asso. Prof. A. W., Ph.D. (Johns Hopkins) Univ. of Maryland, College Park, Md.
RICHMOND, C. A., B.S. (Pomona) Tyngsboro, Mass.
RICHTMEYER, Prof. C. C., Ph.D. (Colo. State Coll. of Educ.) Head of Dept., Central Michigan Coll. of Educ., Mt. Pleasant, Mich.
RICKARD, Asst. Prof. HORTENSE, A.M. (Ohio State) Ohio State Univ., Columbus, Ohio. *79 W. Beaumont Road*
RICKEY, Asso. Prof. F. A., Ph.D. (Louisiana State) Louisiana State Univ., University Sta., Baton Rouge, La.
RIDER, Prof. P. R., Ph.D. (Yale) Washington Univ., St. Louis, Mo.
RIESS, Asst. Prof. J. K., Ph.D. (Brown) Physics, Tulane Univ., New Orleans, La. *17 Audubon Blvd.*
RILEY, F. E., Jr., M.S. (Arizona) Teacher, North Phoenix High School, Phoenix, Ariz. *2nd Lt., U. S. Army Air Forces. P.O. Box 163, Avondale, Ariz.*
RINEHART, Asst. Prof. R. F., Ph.D. (Ohio State) Case School of Appl. Sci., Cleveland, Ohio
RIORDAN, JOHN, B.S. (Yale) Tech. Staff, Bell Telephone Labs., Inc., 463 West St., New York, N.Y.
RIPANDELLI, J. S., A.B. (Columbia) *Technical Sergeant, A.U.S., Medical Detachment*
RITT, Prof. J. F., Ph.D. (Columbia) Columbia Univ., New York, N.Y.
ROBB, J. M., A.M. (Michigan) Asst. Coordinator, E.S.M.W.T. program, Univ. of Southern California, Los Angeles, Calif. *1198 West 29 St., Los Angeles 7, Calif.*
ROBBINS, Asst. Prof. C. K., A.M. (Harvard) Purdue Univ., Lafayette, Ind. *418 Vine St., West Lafayette, Ind.*
ROBERTS, Prof. B. D., Ph.D. (Iowa) New Mexico Highlands Univ., Las Vegas, N.M. *1026 Seventh St.*
ROBERTS, G. G., A.M. (Kentucky) Instr., Berea Coll., Berea, Ky. *6 Estill St.*
ROBERTS, Asso. Prof. J. H., Ph.D. (Texas) Duke Univ., Durham, N.C. *Lt., U.S.N.R.*
ROBERTS, W. C., A.M. (U.C.L.A.) Instr., Jr. Coll., Glendale, Calif. *403 E. Fairview Ave., Glendale 7, Calif.*
ROBERTSON, FRED, A.M. (Indiana) Instr., Iowa State Coll., Ames, Iowa. *Dept. of Math.*
ROBERTSON, W. M. Clerk, Pennsylvania R.R., Philadelphia, Pa. *41 Narbrook Park, Narberth, Pa.*
ROBINSON, FLORA HARDING (Mrs. W. F.), A.M. (North Carolina) Mars Hill Coll., Mars Hill, N.C.
ROBINSON, Asso. Prof. G. deB., Ph.D. (Cambridge) Univ. of Toronto, Toronto, Ont., Can. *National Research Council, Ottawa. 151 Metcalfe St., Ottawa, Ont., Can.*
ROBINSON, Prof. H. A., Ph.D. (Johns Hopkins) Head of Dept., Agnes Scott Coll., Decatur, Ga. *Lt. Col., Field Artillery, U. S. Military Acad., West Point, N. Y.*
ROBINSON, Prof. ROBIN, Ph.D. (Harvard) Chm. of Dept., Math. and Astr., Dartmouth Coll., Hanover, N.H. *16 Allen St.*
ROBINSON, SELBY, Ph.D. (Iowa) Instr., Coll. of the City of New York, 139th St. and Convent Ave., New York, N.Y.
ROCHFORD, Sister M. DEPAZZI, Ph.D. (Notre Dame) Instr., Briar Cliff Coll., Sioux City, Iowa
RODGERS, Dean T. G., A.M. (Wisconsin) Emeritus, New Mexico Highlands Univ., Las Vegas, N.M. *1018 Fourth St.*
ROESSLER, Asso. Prof. E. B., Ph.D. (California) Asso. Statistician, Experiment Sta., Univ. of California Coll. of Agric., Davis, Calif.
ROEVER, Prof. W. H., Ph.D. (Harvard) Washington Univ., St. Louis, Mo.
ROGERS, Asst. Prof. H. P., A.M. (Illinois) Kent State Univ., Kent, Ohio. *1st Lt., Army Air Corps*
ROGERS, Asst. Prof. W. O., B.S. (Bowdoin) Pennsylvania State Coll., State College, Pa. *115 W. Hamilton Ave.*

ROLL, ROSE, A.M. (Columbia) Chm. of Dept., Washington Irving High School, 40 Irving Pl., New York, N.Y.
ROMAN, IRWIN, Ph.D. (Chicago) Senior Geophysicist, Dept. of the Interior, Bureau of Mines. *722 Hunting Pl., Baltimore 29, Md.*
ROOT, Prof. R. E., Ph.D. (Chicago) Math. and Mech., Postgrad. School, U. S. Naval Acad., Annapolis, Md. *7 Franklin St.*
ROSEBRUGH, Prof. T. R., M.A. (Toronto) Elec. Eng., Univ. of Toronto, Toronto, Ont., Can. *92 Walmer Road*
ROSEN, Asso. Prof. J. S., Ph.D. (Washington Univ.) Eastern New Mexico Coll., Portales, N.M.
ROSENBACH, Prof. J. B., M.S. (Illinois) Carnegie Inst. of Tech., Pittsburgh, Pa. *2550 Beechwood Blvd.*
ROSENBAUM, JOSEPH, Ph.D. (Cornell) 488 Park Ave., Bloomfield, Conn.
ROSENBAUM, Mrs. LOUISE JOHNSON, Ph.D. (Colorado) 1628 Polk St., Hollywood, Fla.
ROSENBERG, G. S. Student, Illinois Inst. of Tech., Chicago, Ill. *1501 S. Millard Ave.*
ROSENTHAL, Asst. Prof. ARTHUR, Ph.D. (Munich) Univ. of New Mexico, Albuquerque, N.M. *314 S. Maple St.*
ROSSER, Prof. J. B., Ph.D. (Princeton) Cornell Univ., Ithaca, N.Y. *Consultant, N.D.R.C., Washington 6, D.C. 617 Sheridan St. N.W., Washington 11, D.C.*
ROSSKOPF, M. F., Ph.D. (Brown) *1st Lt., Air Corps*
ROTH, R. E., B.S. (St. Bonaventure) *In Service*
ROTH, S. G., A.M. (North Carolina) Instr., Cooper Union, Cooper Square, New York, N.Y.
ROTHCHILD, Prof. F. E., M.S. (Louisiana State) Math. and Phys. Educ., Arkansas A. and M. Coll., Monticello, Ark.
ROTHROCK, Prof. D. A., Ph.D. (Leipzig) Emeritus, Indiana Univ., Bloomington, Ind. *1000 Atwater Ave.*
ROUSE, Asst. Prof. L. J., Ph.D. (Michigan) Univ. of Michigan, Ann Arbor, Mich. *1137* Michigan Ave.
ROWE, Prof. C. H., M.A. (Dublin) Univ. of Dublin, Dublin, Eire. *38 Trinity College*
ROWLAND, Mrs. ANNIE N., M.S. (Texas Tech.) Instr., Texas Tech. Coll., Lubbock, Tex. *2413-22nd St.*
ROWLAND, Prof. S. A., A.B. (Ouachita) Ohio Wesleyan Univ., Delaware, Ohio. *Lt. Col., U. S. A. 45 Oak Hill Ave., Delaware, Ohio*
RUDDICK, Asst. Prof. C. T., Ph.D. (Pennsylvania) Mount Union Coll., Alliance, Ohio
RUDERMAN, H. D., A.M. (Columbia) Teacher, Jr. High School, New York, N.Y. *1533 Townsend Ave., New York 52, N.Y.*
RUFUS, Prof. W. C., Ph.D. (Michigan) Astr., Univ. of Michigan, Ann Arbor, Mich. *215 Angell Hall*
RULON, Asso. Prof. P. J., Ph.D. (Minnesota) Educ., Harvard Univ., Cambridge, Mass. *13 Kirkland St.*
RUMNEY, ETHEL A., M.S. (Chicago) 309 N. Main St., Sandwich, Ill.
RUNGE, Asst. Prof. LULU L., A.M. (Wisconsin) Univ. of Nebraska, Lincoln, Nebr.
RUNNING, Prof. T. R., Ph.D. (Wisconsin) Emeritus, Univ. of Michigan, Ann Arbor, Mich. *1019 Michigan Ave.*
RUPP, Prof. C. A., Ph.D. (Chicago) Pennsylvania State Coll., State College, Pa. *Capt., Signal Corps. 114 N. Greenbrier St., Arlington, Va.*
RUSH, JACOB, A.B. (Columbia) Teacher, Brooklyn Tech. High School, Brooklyn, N.Y. *29 Ft. Greene Pl.*
RUSK, Prof. EVELYN C. (Mrs. W. S.), Ph.D. (Cornell) Dean, Wells Coll., Aurora, N.Y.
RUSK, Prof. W. J., M.A. (Toronto) Math. and Astr., Grinnell Coll., Grinnell, Iowa. *1415 Park St.*
RUSS, ALEXANDER, A.M. (Duke) Physicist, Naval Aircraft Factory, Philadelphia, Pa. *2423 Curtin Terrace, Philadelphia 45, Pa.*
RUSSELL, Rev. B. M., A.B. (St. Viator's) Instr., Jr. Coll.; Head of Dept., Cathedral Boys' High School, Springfield, Ill. *715 E. Monroe St.*
RUSSELL, Asst. Prof. HELEN G., Ph.D. (Radcliffe) Wellesley Coll., Wellesley, Mass.
RUTT, Prof. N. E., Ph.D. (Pennsylvania) Louisiana State Univ., Baton Rouge, La.

SABEL, R. G. M., B.S. (Mass. Inst. of Tech.) Instr., Bristol High School, Bristol, Conn. *7 Forestville Ave., Plainville, Conn.*
SABIN, MARY S., A.M. (Denver) Teacher, Retired, East High School, Denver, Colo. *1333 E. Tenth Ave., Apt. 1, Denver 3, Colo.*
SACHS, J. M., Ph.D. (Chicago) *Ensign, U.S.N.R., 550 Fort Washington Ave., New York 33, N.Y.*
SADOWSKY, Asso. Prof. M. A., Ph.D. (Berlin) Illinois Inst. of Tech., 3300 Federal St., Chicago, Ill.
SAFFORD, Prof. F. H., Ph.D. (Harvard) Emeritus, Univ. of Pennsylvania, Philadelphia, Pa. *4527 Osage Ave., Philadelphia 43, Pa.*

SAIBEL, Asso. Prof. E. A., Ph.D. (Mass. Inst. of Tech.) Carnegie Inst. of Tech., Pittsburgh, Pa.

SALEM, Asst. Prof. RAPHAEL, Dr. in Math. Sc. (Paris) Massachusetts Inst. of Tech., Cambridge, Mass. *140 Foster St.*

SALKIND, CHARLES, M.S. (C.C.N.Y.) Teacher, S. J. Tilden High School, Brooklyn, N.Y. *1304 New York Ave., Apt. 4H*

SALTZER, CHARLES, A.M. (Nebraska) Part-time Instr., Brown Univ., Providence, R.I. *351 Thayer St.*

SANDERS, Prof. S. T., M.S. (Chicago) Emeritus, Louisiana State Univ., Baton Rouge, La. *Recalled to active service. P.O. Box 1322, Baton Rouge, La.*

SANDERS, S. T., Jr., Ph.D. (Iowa) 3320 Blaine Ave., Detroit 6, Mich.

SANDT, Asst. Prof. J. E., A.M. (Lafayette) Marietta Coll., Marietta, Ohio

SANFORD, Prof. VERA, Ph.D. (Columbia) State Teachers Coll., Oneonta, N.Y.

SANGER, Asst. Prof. R. G., Ph.D. (Chicago) Univ. of Chicago, Chicago, Ill.

SARD, Asst. Prof. ARTHUR, Ph.D. (Harvard) Queens Coll., Flushing, N.Y. *Asso. Research Mathematician, Applied Math. Panel. 146-19 Beech Ave., Flushing, N.Y.*

SASULY, MAX, M.S. (Chicago) Soc. Security Bd., Washington, D.C. *3815 Upton St.*

SAUNDERS, Asst. Prof. J. A., A.M. (North Carolina) The Citadel, Charleston, S.C.

SAUNDERS, R. B., A.M. (Minnesota) Instr., Inst. of Tech., Univ. of Minnesota, Minneapolis, Minn. *Math. and Mech. Dept.*

SAUTÉ, Asso. Prof. GEORGE, A.M. (Brown) Rollins Coll., Winter Park, Fla.

SCAMMON, Prof. R. E., Ph.D. (Harvard) Univ. of Minnesota, Minneapolis, Minn. *172 Bedford St. S.E.*

SCARBOROUGH, Prof. J. B., Ph.D. (Johns Hopkins) U.S. Naval Acad., Annapolis, Md. *Ferry Farms*

SCHACH, ARTHUR, A.M. (Columbia) Jr. Astronomer, U. S. Naval Observ., Washington, D.C.

SCHAEFFER, Sister M. ROSALIN, A.M. (Catholic Univ.) Head of Dept., Ursuline Coll., Louisville 6, Ky. *3115 Lexington Road*

SCHEFFÉ, HENRY, Ph.D. (Wisconsin) Lecturer, Princeton Univ., Princeton, N.J. *Consultant, N.D.R.C. Fine Hall, Princeton, N.J.*

SCHEIER, Rev. M. A., M.S. (Catholic Univ.) Head of Dept., St. Bonaventure Coll., St. Bonaventure, N.Y.

SCHELKINOFF, S. A., Ph.D. (Columbia) Consultant in Electromagnetic Theory, Bell Telephone Labs., 463 West St., New York 14, N.Y.

SCHELL, E. D., A.M. (Western Reserve) Statistician, Bureau of Labor Stat., Washington, D.C. *3440 North 12 Road, Arlington, Va.*

SCHERBERG, M.G., Ph.D. (Minnesota) Aerodynamicist, Chance Vought Aircraft, Stratford, Conn. *87 Locust St., Bridgeport, Conn.*

SCHEY, OLE, A.M. (Minnesota) Teacher, Sr. High School, Gilbert, Minn.

SCHLAUCH, Prof. W. S., A.M. (Columbia) Emeritus, New York Univ., New York, N.Y. *14 Lohman Pl., Dumont, N.J.*

SCHMIDT, O. H., Ph.D. (Brown) Instr., Brown Univ., Providence 12, R.I.

SCHNEFEL, EDNA COFIELD, A.M. (Alabama) Asst. Engr., Sperry Products, Inc., Hoboken, N.J. *334 Paterson Plank Road, Jersey City, N.J.*

SCHNEPP, Prof. R. F., Ph.D. (Fribourg) Head of Dept., St. Mary's Univ. of San Antonio, San Antonio 7, Tex.

SCHOENBERG, Asst. Prof. I. J., Ph.D. (Jassy) Univ. of Pennsylvania, Philadelphia, Pa. *236 Seneca Ave., Havre de Grace, Md.*

SCHORLING, Prof. RALEIGH, Ph.D. (Columbia) Educ., Univ. of Michigan, Ann Arbor, Mich. *School of Education*

SCHRAUT, Asst. Prof. K. C., Ph.D. (Cincinnati) Univ. of Dayton, Dayton 9, Ohio

SCHREIBER, Prof. E. W., A.M. (Chicago) Western Illinois State Teachers Coll., Macomb, Ill. *719 W. Adams St.*

SCHROEDER, Asso. Prof. H. F., M.S. (Louisiana) Louisiana Poly. Inst., Ruston, La.

SCHULT, VERYL G., A.M. (George Washington) Instr., Wilson Teachers Coll.; Head of Dept., Washington High Schools, Washington, D.C. *Wardman Park Hotel*

SCHULTZ, O. T., M.S. (Chicago) Asst. Project Engr., Sperry Gyroscope Co., Inc., Garden City, N.Y. *365 Stewart Ave.*

SCHWARTZ, ABRAHAM, Ph.D. (Mass. Inst. of Tech.) Instr., Pennsylvania State Coll., State College, Pa. *Dept. of Math.*

SCHWARTZ, A. A., M.S. in Educ. (C.C.N.Y.) Teacher, Textile Evening High School, New York, N.Y.; Certifying Officer, Railroad Retirement Board, New York, N.Y. *55 Parade Pl., Brooklyn, N.Y.*

SCHWARTZ, Asst. Prof. H. M., Ph.D. (Pennsylvania) Univ. of Idaho, Moscow, Idaho. *P.O. Box 47*

SCHWEITZER, A. R., Ph.D. (Chicago) 452 Oakdale Ave., Chicago, Ill.

SCHWID, Asso. Prof. NATHAN, Ph.D. (Wisconsin) Texas Coll. of Mines and Met., El Paso, Tex.
SCIBIORSKI, TRYPHENA HOWARD, M.A. (Michigan) Instr., Illinois Inst. of Tech., Chicago, Ill. *5111 S. University Ave.*
SCOBERT, W. G., A.B. (U.C.L.A.) Instr., Univ. of Oregon, Eugene, Ore. *440½ Blair Blvd.*
SCOBLIC, Sister CLAUDETTE, A.M. (Minnesota) Asst. Prof., Coll. of St. Benedict, St. Joseph, Minn.
SCOTT, E. J., A.M. (Vanderbilt) Instr., Cornell Univ., Ithaca, N.Y. *502 Dryden Road*
SCOTT, P. C., Ph.D. (Peabody) *In Service*
SCOTT, W. M., Ph.D. (Michigan) Special Agent, Federal Bureau of Investigation, Washington, D.C.
SCOTT, W. T., Ph.D. (Rice) *1st Lt., Ordnance. 151 Oakmont St., San Antonio, Tex.*
SEALANDER, Asst. Prof. C. E., Ph.D. (Iowa) Univ. of South Dakota, Vermillion, S.D. *623 E. Main St.*
SEAMONS, R. S., A.B. (Utah) *1st Lt., Coast Artillery*
SEARS, W. H., Jr., A.M. (Harvard) Instr., U. S. Naval Acad., Annapolis, Md. *Dept. of Math.*
SEDLAK, G. A. Instr., Cudahy Voc. School, Cudahy, Wis.
SEEBECK, Asst. Prof. C. L., Jr., Ph.D. (North Carolina) Univ. of Alabama, University, Ala. *P.O. Box 814*
SEIDEL, Asso. Prof. WLADIMIR, Ph.D. (Munich) Univ. of Rochester, Rochester, N.Y.
SEIDLIN, Prof. JOSEPH, Ph.D. (Columbia) Dir., Grad. Div., Alfred Univ., Alfred, N.Y.
SELBY, Asso. Prof. SAMUEL, Ph.D. (Chicago) Univ. of Akron, Akron, Ohio
SELLEW, Prof. G. T., Ph.D. (Yale) Emeritus, Knox Coll., Galesburg, Ill. *140 W. Eighth St., Claremont, Calif.*
SERGESCU, Prof. PETRE, Lic. ès Sc. (Paris), Dr. ès Sc. (Bucarest) Fac. des Sciences, Univ. of Cluj, Timisoara, Roumania
SEUBERT, G. A., B.S. (Pittsburgh) Box 107, Latrobe, Pa.
SEWELL, Asst. Prof. W. E., Ph.D. (Harvard) Georgia School of Tech., Atlanta, Ga. *Major, U. S. Army*
SHAH, Prof. N. M., M.A. (Cantab.) Prin., and Prof. of Math., M.T.B. Coll., Surat, India
SHANKS, M. E., Ph.D. (Iowa) Instr., Univ. of Missouri, Columbia, Mo. *Engineering Bldg.*
SHAUB, Prof. H. C., Ph.D. (Cornell) Head of Dept., Washington and Jefferson Coll., Washington, Pa.
SHEEHY, M. J., A.B. (U.C.L.A.) *Asst. Physicist, Univ. of California Div. of War Research. U. S. Navy Radio and Sound Lab., San Diego 6, Calif.*
SHEERAN, Sister M. LAURINE, A.M. (Catholic Univ.) Instr., Mount St. Joseph Jr. Coll., Maple Mount, Ky.
SHEFFER, Prof. I. M., Ph.D. (Harvard) Pennsylvania State Coll., State College, Pa. *212 Liberal Arts Bldg.*
SHELDON, Prof. E. W., Ph.D. (Yale) Univ. of Alberta, Edmonton, Alta., Can.
SHENTON, Prof. W. F., Ph.D. (Johns Hopkins) American Univ., Washington 16, D.C. *3605 Porter St. N.W.*
SHERER, Prof. C. R., A.M. (Nebraska) Personnel Dir., Texas Christian Univ., Fort Worth, Tex.
SHERIDAN, Prof. L. W., Ph.D. (Catholic Univ.) Coll. of Mount St. Vincent, New York, N.Y. *Research, U. S. Weather Bureau. 3302 Ely Place S.E., Apt. 3, Washington, D.C.*
SHERWOOD, Prof. G. E. F., Ph.D. (Chicago) Univ. of California at Los Angeles, Los Angeles, Calif. *400 N. Barrington Ave., Los Angeles 24, Calif.*
SHEWHART, W. A., Ph.D. (California) Research Statistician, Bell Telephone Labs., New York, N.Y. *158 Lake Drive, Mountain Lakes, N.J.*
SHIRES, C. J., M.S. (Michigan) Teacher, Public Schools, Detroit, Mich. *13579 Monica Ave.*
SHIRK, Prof. J. A. G., M.S. (Kansas) Head of Dept., Kansas State Teachers Coll., Pittsburg, Kans.
SHIVELY, Asso. Prof. L. S., Ph.D. (Chicago) Ball State Teachers Coll., Muncie, Ind. *2110 W. Jackson St.*
SHOHAT, Prof. J. A., Ph.D. (Petrograd) Univ. of Pennsylvania, Philadelphia, Pa. *600 S. Eagle Road, Manoa, Upper Darby P.O., Pa.*
SHOOK, Asso. Prof. C. A., Ph.D. (Johns Hopkins) Lehigh Univ., Bethelem, Pa. *1122 W. Broad St.*
SHORT, C. A., M.S. (Delaware) Head of Dept., Lewes Public School, Lewes, Del.
SHORT, Prof. W. T., A.M. (Oklahoma) Oklahoma Baptist Univ., Shawnee, Okla.
SHREVE, D. R., Ph.D. (Illinois) Stress Analyst, McDonnell Aircraft Corp., St. Louis, Mo.
SHRINER, Prof. W. O., Ph.D. (Michigan) Head of Dept., Indiana State Teachers Coll., Terre Haute, Ind. *2525 N. Ninth St.*
SHULER, C. EUCEBIA, Ph.D. (Peabody) Sloan Coll., Univ. of South Carolina, Columbia, S.C.

SHUMAN, J. W., B.S. (Mass. Inst. of Tech.) Consulting Engr., 716 Metropolitan Life Bldg., Minneapolis, Minn.

SHUMWAY, Prof. R. R., A.B. (Minnesota) Asst. Dean, Univ. of Minnesota, Minneapolis, Minn.

SHUSTER, Prof. C. N., A.M. (Columbia) State Teachers Coll., Trenton, N.J.

SICELOFF, Prof. L. P., Ph.D. (Columbia) Columbia Univ., New York, N.Y.

SIGLEY, Asso. Prof. D. T., Ph.D. (Illinois) Kansas State Coll., Manhattan, Kans. *Physics Lab., Johns Hopkins Univ., 8621 Georgia Ave., Silver Spring, Md.*

SILBER, JACK, B.S. (Chicago) Instr., Illinois Institute of Tech., Chicago, Ill. *4908 N. Springfield Ave.*

SILLER, HARRY, M.S. (New York Univ.) Asso. Statistician, Department of State, Washington, D.C. *2817—28th St. S.E., Washington 20, D.C.*

SILVERMAN, Prof. L. L., Ph.D. (Missouri) Dartmouth Coll., Hanover, N.H.

SIMESTER, Asso. Prof. J. H., M.A. (Toronto) Speed Scientific School, Univ. of Louisville, Louisville, Ky.

SIMMONS, Asso. Prof. H. A., Ph.D. (Chicago) Northwestern Univ., Evanston, Ill.

SIMON, Prof. W. G., Ph.D. (Chicago) Vice-Pres., Dean of Faculties of Arts and Sci., Western Reserve Univ., Cleveland, Ohio

SIMONS, Prof. LAO G., Ph.D. (Columbia) Emeritus, Hunter Coll., New York, N.Y. *875 West End Ave.*

SIMPSON, R. C., Jr., A.M. (Syracuse) Grad. Asst., Univ. of Wisconsin, Madison, Wis. *North Hall*

SIMPSON, Prof. T. M., Ph.D. (Wisconsin) Dean, Grad. School, Univ. of Florida, Gainesville, Fla. *717 S. Ninth St.*

SIMPSON, Prof. T. McN., Jr., Ph.D. (Chicago) Randolph-Macon Coll., Ashland, Va. *Box 345*

SINCLAIR, Prof. MARY EMILY, Ph.D. (Chicago) Oberlin Coll., Oberlin, Ohio. *260 Oak St.*

SINGER, JAMES, Ph.D. (Princeton) Instr., Brooklyn Coll., Brooklyn, N.Y. *3054 Bedford Ave.*

SINGER, MAURICE, B.S. (Tulane) *Pvt., U. S. A. 4600 Freret St., New Orleans, La.*

SINGER, Prof. S. A., A.M. (Capital) Capital Univ., Columbus, Ohio. *2322 E. Main St.*

SIROKY, EDMOND, M.S. (Washington Univ.) Stress Analyst, Curtiss-Wright Corp., Airplane Div., St. Louis, Mo. *789 Yale Ave., University City, Mo.*

SISAM, Prof. C. H., Ph.D. (Cornell) Colorado Coll., Colorado Springs, Colo.

SISK, Prof. AUGUSTUS, Ph.D. (Cornell) Maryville Coll., Maryville, Tenn. *117 Miller Ave.*

SKARSTEDT, Prof. MARCUS, Ph.D. (California) Librarian, San Francisco Jr. Coll., Phelan Ave., San Francisco, Calif.

SKELDING, A. Z., A.B. (C.C.N.Y.) Asst. Actuary, Natl. Council on Compensation Ins., New York, N.Y. *116 Stanton Ave., Baldwin, N.Y.*

SKELLY, Sister MARY LUCINA, Ph.D. (Georgetown) Prof., Georgetown Visitation Jr. Coll., 1500-35th St., Washington 7, D.C.

SLEIGHT, Prof. E. R., A.M. (Albion) Albion Coll., Albion, Mich. *410 Allen Pl.*

SLEPIN, BENJAMIN, LL.B. (South Jersey Law Sch.) Instr., Frankford Arsenal Trade School, Philadelphia, Pa. *422 South 57th St.*

SLOAN, Prof. A. R., A.M. (Vanderbilt) Carson-Newman Coll., Jefferson City, Tenn.

SLOBIN, Prof. H. L., Ph.D. (Clark) Dean, Grad. School, Univ. of New Hampshire, Durham, N.H.

SLOTNICK, M. M., Ph.D. (Harvard) Supervisor of geophysical interpretation, Humble Oil and Refining Co., Houston, Tex. *4421 Roseneath Dr., Houston 4, Tex.*

SMAIL, Prof. L. L., Ph.D. (Columbia) Lehigh Univ., Bethlehem, Pa.

SMILEY, Asso. Prof. C. H., Ph.D. (California) Astr.; Dir. of Ladd Observatory, Brown Univ., Providence 12, R.I.

SMILEY, Asst. Prof. M. F., Ph.D. (Chicago) Lehigh Univ., Bethlehem, Pa. *Lt. (j.g.), U.S.N.R. 23 State Circle, Annapolis, Md.*

SMITH, Asst. Prof. A. LEE, A.M. (Duke) Math. and Engg., Coll. of William and Mary, and Virginia Poly. Inst., Norfolk Div., Norfolk, Va. *Lt., U.S.N.R. 5209 Argall Ave., Norfolk 8, Va.*

SMITH, Asst. Prof. ADAM J., Ph.D. (Pennsylvania) Montana School of Mines, Butte, Mont.

SMITH, Prof. C. D., Ph.D. (Iowa) Head of Dept., Mississippi State Coll., State College, Miss.

SMITH, Asso. Prof. C. E., Ph.D. (California) Astr., San Diego State Coll., San Diego, Calif. *Lt. Comdr., U.S.N.R.*

SMITH, Asst. Prof. C. V. L., Ph.D. (Harvard) Lafayette Coll., Easton, Pa. *Lt., U.S.N.R., Instr., Postgrad. School, U. S. Naval Acad., Annapolis, Md.*

SMITH, C. W., A.M. (Wisconsin) Acting Pres., Retired, State Teachers Coll., Superior, Wis. *401 E. Third St.*

SMITH, Prof. D. E., Ph.D. (Syracuse) Emeritus, Columbia Univ., New York, N.Y. *501 West 120 St., New York 27, N.Y.*

SMITH, Prof. D. M., Ph.D. (Chicago) Head of Dept., Georgia School of Tech., Atlanta, Ga.
SMITH, Prof. EDWARD S., Ph.D. (Virginia) Univ. of Cincinnati, Cincinnati 21, Ohio
SMITH, Prof. EDWIN R., Ph.D. (Munich) Head of Dept., Iowa State Coll., Ames, Iowa
SMITH, Prof. ELMER R., A.M. (Vanderbilt) Retired, State Coll. for Women, Tallahassee, Fla. *648 W. Call St.*
SMITH, F. C., Ph.D. (Michigan) Actuarial Dept., Lincoln Natl. Life Ins. Co., Fort Wayne, Ind.
SMITH, Asst. Prof. F. E., Ph.D. (Catholic Univ.) Brooklyn Coll., Brooklyn, N.Y. *Box 49, Wantagh, N.Y.*
SMITH, GENEVA M., A.B. (Maine) Head of Dept., Plymouth Normal School, Plymouth, N.H.
SMITH, Prof. G. W., Ph.D. (Illinois) Univ. of Kansas, Lawrence, Kans. *1730 Illinois St.*
SMITH, Prof. H. L., Ph.D. (Chicago) Louisiana State Univ., University Sta., Baton Rouge, La. *208A Nicholson Hall*
SMITH, H. R., M.S. (South Carolina) Head of Dept., Baltimore Poly. Inst., Baltimore, Md. *Capt., Air Corps. Lowrys, S.C.*
SMITH, Asso. Prof. H. W., Ph.D. (Texas) Oklahoma A. and M. Coll., Stillwater, Okla. *132 Husband St.*
SMITH, Prof. I. W., A.M. (Illinois) Emeritus, North Dakota Agric. Coll.; Actuary, Ancient Order of United Workmen, Fargo, N.D. *203 Tenth St. N.*
SMITH, J. C., A.M. (Buffalo) Instr., Cornell Univ., Ithaca, N.Y. *Dept. of Math.*
SMITH, Rev. J. P., A.M. (Woodstock) Church of the Gesu, 18th and Thompson Sts., Philadelphia, Pa.
SMITH, Prof. L. W., Ph.D. (Washington and Lee) Washington and Lee Univ., Lexington, Va. *P.O. Box 744*
SMITH, Prof. P. K., Ph.D. (Illinois) Head of Dept., Louisiana Poly. Inst., Ruston, La. *416 N. Line St.*
SMITH, R. E., A.M. (North Carolina) Instr., Allegheny Coll., Meadville, Pa. *Box 64, Allegheny Coll.*
SMITH, Prof. R. G., Ph.D. (Kansas) State Teachers Coll., Pittsburg, Kans.
SMITH, S. J., A.M. (Pittsburgh) Chm. of Dept., State Teachers Coll., Lock Haven, Pa.
SMITH, Asst. Prof. S. R., Ph.D. (Indiana) Carnegie Inst. of Tech., Pittsburgh, Pa. *In Service*
SMITH, Prof. W. F., A.M. (Kentucky) West Virginia Inst. of Tech., Montgomery, W.Va. *P.O. Box 788*
SMITH, Prof. W. M., Ph.D. (Columbia) Head of Dept., Lafayette Coll., Easton, Pa.
SMITH, Asst. Prof. ZENS L., M.S. (Chicago) Asst. Dean, Univ. of Chicago, Chicago, Ill. *5621 Drexel Ave.*
SMYTH, RUTH B. (Mrs. B. J.), A.M. (Oberlin) 273 Morgan St., Oberlin, Ohio
SMYTH, Asso. Prof. S. GRACE, A.M. (Columbia) Dean of Women, Knox Coll., Galesburg, Ill.
SNADER, Asst. Prof. D. W., Ed.D. (Columbia) Supervisor of Math., New York State Coll. for Teachers, Albany, N.Y. *27 Danker Ave., Albany 3, N.Y.*
SNEDECOR, Prof. G. W., A.M. (Michigan) Dir., Statistical Lab., Iowa State Coll., Ames, Iowa
SNYDER, Asso. Prof. A. D., A.M. (Wisconsin) Union Coll., Schenectady 8, N.Y. *1592 Union St.*
SNYDER, Prof. VIRGIL, Ph.D. (Göttingen) Emeritus, Cornell Univ., Ithaca, N.Y. *Visiting Prof., Rollins Coll., Winter Park, Fla.*
SOBCZYK, ANDREW, Ph.D. (Princeton) Instr., Oregon State Coll., Corvallis, Ore. *Radiation Lab., Massachusetts Inst. of Tech., Cambridge, Mass. 32 Bow St., Lexington, Mass.*
SOHON, Rev. F. W., Ph.D. (Georgetown) Dean of Grad. School; Dir., Seismolog. Observatory, Georgetown Univ., Washington, D.C.
SOKOLNIKOFF, Prof. I. S., Ph.D. (Wisconsin) Univ. of Wisconsin, Madison, Wis. *Special Consultant, Army Air Forces*
SOLLINS, A.D. Asst. Mathematician, U. S. Coast and Geodetic Survey, Washington, D.C. *1501-27th St. S.E., Washington 20, D.C.*
SORRELLS, RUTH C. (Mrs. C. C.), A.M. (Columbia) Teacher, Highland Park High School, Dallas, Tex. *619 N. Montclair St.*
SOUSLEY, Prof. C. P., Ph.D. (Johns Hopkins) Rose Poly. Inst., Terre Haute, Ind. *92 Potomac Ave.*
SOUTH, Asso. Prof. D. E., Ph.D. (Michigan) Univ. of Kentucky, Lexington, Ky.
SPARKS, Prof. F. W., Ph.D. (Chicago) Texas Tech. Coll., Lubbock, Tex. *Box 94, Tech. Sta.*
SPEAR, Prof. JOSEPH, A.M. (Boston Univ.) Northeastern Univ., Boston, Mass.
SPEARMAN, ETHEL, A.M. (Stanford) Teacher, High School, Sanger, Calif. *P.O. Box 315*
SPEEKER, Asso. Prof. G. G., A.M. (Indiana) Michigan State Coll., East Lansing, Mich.
SPEICHER, Asst. Prof. P. I., A.M. (Pennsylvania) Albright Coll., Reading, Pa.
SPENCELEY, Asso. Prof. G. W., A.M. (Harvard) Miami Univ., Oxford, Ohio. *400 E. Church St.*

SPENCER, Prof. H. E., Ph.D. (Cornell) Presbyterian Coll., Clinton, S.C. *21 Calhoun St.*
SPENCER, Prof. MARY C., M.S. (Cornell) Emeritus, Newcomb Coll., New Orleans, La. *1111 Lowerline St., New Orleans 18, La.*
SPENCER, R. S., M.S. (Michigan) Research Physicist, Dow Chemical Co., Midland, Mich. *216 William St.*
SPENCER, VIVIAN E., Ph.D. (Pennsylvania) Sr. Statistician, U. S. Bureau of the Census, Washington, D.C. *2905 Russell Rd., Alexandria, Va.*
SPERRY, Asso. Prof. PAULINE, Ph.D. (Chicago) Univ. of California, Berkeley, Calif. *Box 28 Wheeler Hall*
SPICER, Asso. Prof. LUCY E., A.M. (Columbia) Western State Coll. of Colorado, Gunnison, Colo.
SPINKS, M.J. Bridge Engr., 425 W. Main St., Wilmington, Ohio
SPITZBART, Prof. ABRAHAM, Ph.D. (Harvard) Coll. of St. Thomas, St. Paul 1, Minn. *Campus Club, Univ. of Minnesota, Minneapolis 14, Minn.*
SPOONER, Prof. C. C., A.M. (Amherst) Head of Dept., Retired, Northern Michigan Coll. of Educ., Marquette, Mich. *117 E. Ridge St.*
SPRINGER, Prof. C. E., Ph.D. (Chicago) Univ. of Oklahoma, Norman, Okla.
STABLER, Asst. Prof. E. R., Ed.D. (Harvard) Hofstra Coll., Hempstead, N.Y.
STALEY, Prof. R. C., Ph.D. (Michigan) Head of Dept., Univ. of North Dakota, Grand Forks, N.D. *321 Cambridge St.*
STANLEY, E. L., M.S. (Tennessee) Instr., Clemson Coll., Clemson, S.C. *Box 409*
STANWICK, C. A., B.S. in E.E. (Washington) Elec. Engr., 131 Rynda Road, South Orange, N.J.
STARCHER, Prof. G. W., Ph.D. (Illinois) Acting Dean of Grad. Coll. and Coll. of Arts and Sci., Ohio Univ., Athens, Ohio. *Route 3*
STARK, Asso. Prof. MARION E., Ph.D. (Chicago) Wellesley Coll., Wellesley, Mass. *6 Waban St.*
STARKE, Asso. Prof. E. P., Ph.D. (Columbia) Rutgers Univ., New Brunswick, N.J.
STARR, Asst. Prof. D. W., Ph.D. (Illinois) Southern Methodist Univ., Dallas, Tex. *Dept. of Math.*
STARR, Asso. Prof. E. M., A.B. (Indiana) Carnegie Inst. of Tech., Pittsburgh, Pa. *1541 Asbury Pl., Squirrel Hill Sta.*
STARRETT, Asst. Prof. A. L., A.M. (Harvard) Georgia School of Tech., Atlanta, Ga.
STAUFFER, J. R. K., M.S. (Chicago) Rhode Island State Coll., Kingston, R.I. *Dept. of Math.*
STAYER, Asst. Prof. J. C., A.M. (Pittsburgh) Dean of Men, Juniata Coll., Huntingdon, Pa. *1618 Moore St.*
STEARN, J. L., M.S. (C.C.N.Y.) Mathematician, U. S. Coast and Geodetic Survey, Washington, D.C. *Capt., U. S. Army, Ordnance, Proving Center, Aberdeen Proving Ground, Md.*
STEED, Asso. Prof. D. V., Ph.D. (California) Head of Dept., Univ. of Southern California, Los Angeles 7, Calif. *1731 West 80 St., Los Angeles 44, Calif.*
STEEN, Asso. Prof. F. H., Ph.D. (Harvard) Allegheny Coll., Meadville, Pa. *900 H Street*
STEINHAUS, H. W., Ph.D. (Göttingen) Chief, Research Div., Group Dept., Equitable Life Assur. Soc., New York, N.Y. *Elm Ridge Farm, Scarsdale, N.Y.*
STELFORD, Asst. Prof. NORMA K., A.M. (Northwestern) Northern Illinois State Teachers Coll., DeKalb, Ill.
STELSON, Prof. H. E., Ph.D. (Iowa) Kent State Univ., Kent, Ohio. *540 S. Lincoln St.*
STEPHENS, C. F., Ph.D. (Michigan) Instr., Prairie View State Coll., Prairie View, Tex. *Specialist, U.S.N.R.; Teacher, Great Lakes Naval Trg. Sta., Great Lakes, Ill. 68-B Morrow St., Great Lakes, Ill.*
STEPHENS, Prof. R. C., Ph.D. (Iowa) Knox Coll., Galesburg, Ill.
STEPHENS, Prof. R. P., Ph.D. (Johns Hopkins) Head of Dept., Univ. of Georgia, Athens, Ga.
STETSON, Prof. J. M., Ph.D. (Princeton) Coll. of William and Mary, Williamsburg, Va.
STEVENS, W. R., A.B. (George Washington) Meteorologist, U. S. Weather Bureau, New Orleans, La. *1124 Second St., New Orleans 13, La.*
STEVENSON, Prof. GUY, Ph.D. (Illinois) Head of Dept., Univ. of Louisville, Louisville, Ky.
STEWART, Asst. Prof. B. M., Ph.D. (Wisconsin) Denison Univ., Granville, Ohio. *Box 483*
STEWART, E. C., B.A. (British Columbia) Teacher, Math. and Sci., Wells-Barkerville School, Wells, B.C., Can. *Box 86*
STEWART, Asso. Prof. I. D., A.M. (California) Whitman Coll., Walla Walla, Wash.
STIGLER, Asso. Prof. G. J., Ph.D. (Chicago) Econ., Univ. of Minnesota, Minneapolis, Minn. *National Bureau of Economic Research, 1819 Broadway, New York, N.Y.*
STILWELL, M. F., A.M. (Syracuse) Instr., Rensselaer Poly. Inst., Troy, N.Y. *19 Lansing Ave.*
STOKES, ELLEN C., Ph.D. (Chicago) Dean of Women, Instr., New York State Coll. for Teachers, Albany, N.Y.
STOKES, Prof. RUTH W., Ph.D. (Duke) Winthrop Coll., Rock Hill, S.C.
STONE, Prof. M. H., Ph.D. (Harvard) Harvard Univ., Cambridge, Mass. *30 Hillside Ave.*

STONE, Asso. Prof. R. B., A.M. (Harvard) Registrar, Purdue Univ., Lafayette, Ind. *615 Russell St., West Lafayette, Ind.*
STORM, Asso. Prof. W. B., A.M. (Chicago) Head of Dept., Northern Illinois State Teachers Coll., DeKalb, Ill. *636 W. Lincoln St.*
STORY, HELEN F., A.M. (Wellesley) Instr., St. Petersburg Jr. Coll., St. Petersburg, Fla.
STOUFFER, Prof. E. B., Ph.D. (Illinois) Dean, Univ. of Kansas, Lawrence, Kans. *1019 Maine St.*
STOWELL, Prof. C. J., Ph.D. (Illinois) Dean, McKendree Coll., Lebanon, Ill. *810 Belleville St.*
STRANE, A. J., E.Mines (Minnesota) Jr. Coll., Duluth, Minn. *1928 E. Fifth St.*
STRATTON, Prof. W. T., Ph.D. (Washington) Head of Dept., Kansas State Coll., Manhattan, Kans.
STRAW, Asst. Prof. J. A., A.M. (Michigan State) Rose Poly. Inst., Terre Haute, Ind. *2637 Fenwood Ave.*
STREET, R. E., Ph.D. (Harvard) Visiting Lecturer, Physics, Dartmouth Coll., Hanover, N.H. *Wilder Lab.*
STRIGHT, Asst. Prof. I. L., A.M. (Allegheny Coll.) Baldwin-Wallace Coll., Berea, Ohio. *209 Beech St.*
STROBEL, C. F., Ph.D. (Illinois) Instr., North Carolina State Coll., Raleigh, N.C. *Dept. of Math.*
STROCK, E. E., A.M. (Yale) Asst. Mathematician, Prudential Ins. Co., Newark, N.J. *Lt., U.S.N.R.*
STRONG, Prof. CORA, A.M. (Michigan) Woman's Coll., Univ. of North Carolina, Greensboro, N.C. *109 Adams St.*
STRUYK, ADRIAN, A.M. (Columbia) Teacher, High School, Clifton, N.J. *232 Jefferson St., Paterson 2, N.J.*
STUART, H. L., A.B. (Dickinson) *In Service. 402 S. Hanover St., Carlisle, Pa.*
STUCKEY, C. S., Ph.M. (Wisconsin) Metropolitan Life Ins. Co., New York, N.Y. *1601 Metropolitan Ave., New York 62, N.Y.*
STURGES, Mrs. FALKA G., A.M. (California) Teacher, Public Schools, San Francisco, Calif. *790 Hopkins Ave., Redwood City, Calif.*
STURM, R. G., Ph.D. (Illinois) Research Engr. Physicist, Aluminum Co. of America, Box 772, New Kensington 11, Pa. *Aluminum Research Labs.*
SUFFA, Prof. MARY C., A.M. (Brown) Elmira Coll., Elmira, N.Y.
SULLIVAN, Sister M. CLOTILDA, A.M. (Canisius) Instr., Mercyhurst Coll., Erie, Pa.
SULLIVAN, Sister M. HELEN, Ph.D. (Catholic Univ.) Chm. of Dept., Mount St. Scholastica Coll., Atchison, Kans.
SUMMERS, C. R., A.M. (State Coll. of Washington) *In Service*
SUMNER, Mrs. RUTH G., Ed.M. (Stanford) Teacher, Oakland High School, Oakland, Calif. *3000 Central Ave., Alameda, Calif.*
SWANSON, A. G., Ph.D. (Michigan) 205 W. Taylor St., Flint, Mich.
SWANSON, E. L., A.M. (Colorado Coll.) Instr., South Dakota State School of Mines, Rapid City, S.D.
SWANSON, Asst. Prof. L. W., A.M. (Minnesota) Coe Coll., Cedar Rapids, Iowa
SWEAZEY, Prof. G. B., A.M. (Wabash) Dean, Westminster Coll., Fulton, Mo.
SWENSON, J. A., Ph.D. (Columbia) Asso., Teachers Coll., Columbia Univ.; Head of Dept., Andrew Jackson High School, New York, N.Y.
SWIFT, Prof. ELIJAH, Ph.D. (Göttingen) Dean, Univ. of Vermont, Burlington, Vt. *415 S. Willard St.*
SWINGLE, Asso. Prof. P. M., Ph.D. (Michigan) New Mexico State Coll., State College, N.M. *Box 277*
SYNGE, Prof. J. L., Sc.D. (Dublin) Ohio State Univ., Columbus, Ohio
SZÁSZ, Prof. OTTO, Ph.D. (Budapest) Research Lecturer, Univ. of Cincinnati, Cincinnati, Ohio
SZEGÖ, Prof. GABOR, Ph.D. (Vienna) Stanford Univ., Stanford University, Calif.

TALBOT, Prof. W. R., Ph.D. (Pittsburgh) Lincoln Univ., Jefferson City, Mo.
TALIAFERRO, Prof. CARRIE B., A.M. (Columbia) State Teachers Coll., Farmville, Va. *Box 392*
TAMARKIN, Prof. J. D., M.A.M. (Petrograd) Brown Univ., Providence, R.I.
TANZOLA, J. J., A.M. (Columbia) Instr., Cooper Union, New York, N.Y. *2041 Watson Ave., Bronx, N.Y.*
TAPPAN, Prof. A. HELEN, Ph.D. (Cornell) Dean, Western Coll., Oxford, Ohio
TATE, Asso. Prof. HERBERT, M.A. (Dublin) McGill Univ., Montreal, P.Q., Can.
TATE, JENNIE L., A.M. (Wisconsin) Head of Dept., McMurry Coll., Abilene, Tex. *1301 Orange St.*
TAYLOR, Asst. Prof. A. E., Ph.D. (Calif. Inst. of Tech.) Univ. of California at Los Angeles, Los Angeles, Calif. *Dept. of Math.*

TAYLOR, B. P., A.M. (U.C.L.A.) Mathematician, Sr. Grade, Douglas Aircraft Co., Santa Monica, Calif. *11326 Gladwin St., Los Angeles 24, Calif.*
TAYLOR, C. F., B.S. (Northeastern Univ.) Elec. Engr., General Electric Co., West Lynn Works, Lynn, Mass. *69 Cross St., Randolph, Mass.*
TAYLOR, Prof. E. H., Ph.D. (Harvard) Eastern Illinois State Teachers Coll., Charleston, Ill.
TAYLOR, Asst. Prof. F. J., A.B. (St. Thomas) Coll. of St. Thomas, St. Paul 4, Minn.
TAYLOR, Prof. H. O., Ph.D. (Cornell) Chm. of Dept., Math. and Physics, Wheaton Coll., Wheaton, Ill.
TAYLOR, Prof. J. H., Ph.D. (Chicago) George Washington Univ., Washington, D.C.
TAYLOR, Prof. MILDRED E., Ph.D. (Illinois) Math. and Astr., Mary Baldwin Coll., Staunton, Va.
TAYLOR, S. HELEN, Ph.D. (Illinois) Instr., Auburn Unit, Syracuse Univ., Auburn, N.Y.
TAYLOR, W. C., Ph.D. (Wisconsin) Instr., Univ. of Cincinnati, Cincinnati, Ohio
TAYLOR, Prof. W. E., Ph.D. (Syracuse) Emeritus, Syracuse Univ., Syracuse, N.Y. *822 Irving Ave.*
TEMPLE, Prof. V. B., A.M. (Texas) Louisiana Coll., Pineville, La.
TEMPLIN, L. J., A.M. (Loyola Univ.) Instr., Loyola Univ., Chicago, Ill.
THÉBAULT, VICTOR. Mutuelle Générale Française Vie, Urbieta 1, San Sebastian, Spain
THIELMAN, Asst. Prof. H. P., Ph.D. (Ohio State) Iowa State Coll., Ames, Iowa. *Dept. of Math.*
THOMAS, Prof. C. F., M.S. (Case) Case School of Appl. Sci., Cleveland, Ohio
THOMAS, EARL, M.S. (Louisiana) P. O. Box 72, Maypearl, Tex.
THOMAS, Prof. J. M., Ph.D. (Pennsylvania) Duke Univ., Durham, N.C. *4785 Duke Sta.*
THOMAS, P. D., A.M. (Oklahoma) Jr. Geodetic Engr., U. S. Coast and Geodetic Survey, Washington, D.C. *Seaman 1st Class, U. S. Navy*
THOMAS, R. W., Ph.D. (Pittsburgh) Dean of Students, Washington and Jefferson Coll., Washington, Pa.
THOMAS, Prof. T. Y., Ph.D. (Princeton) Univ. of California at Los Angeles, Los Angeles, Calif.
THOMPSON, Prof. E. L., Ph.D. (Chicago) Texas Tech. Coll., Lubbock, Tex.
THOMPSON, Asso. Prof. J. E., A.M. (Columbia) Pratt Inst., Brooklyn, N.Y. *183 Steuben St.*
THOMPSON, LOUISE, A.M. (Columbia) Registrar, Instr., Shorter Coll., Rome, Ga.
THOMPSON, W. I., A.M. (California) Instr., Los Angeles City Coll., Los Angeles, Calif. *122 West 50 St., Los Angeles 37, Calif.*
THOMSON, Asst. Prof. J. F., Ph.D. (Michigan) Tulane Univ., New Orleans 15, La.
THORNE, Asst. Prof. C. J., Ph.D. (Iowa) Louisiana State Univ., Baton Rouge, La.
THORNTON, H. B., A.M. (Cincinnati) Instr., Sumner Jr. Coll., Kansas City, Kans. *1225 Everett Ave.*
THORNTON, MRS. MARIAN W., Ph.D. (Minnesota) 372 N. Cleveland Ave., St. Paul, Minn.
THORP, ELLA, A.B. (Minnesota) Instr., Univ. of Minnesota, Minneapolis, Minn. *656 Jefferson St. N.E.*
THRALL, Asst. Prof. R. M., Ph.D. (Illinois) Univ. of Michigan, Ann Arbor, Mich. *Dept. of Math.*
THROCKMORTON, V. C., A.M. (Southern California) Visiting Instr., Univ. of Southern California, Los Angeles, Calif. *821 N. Heliotrope Dr.*
THUENER, Sister M. DOMITILLA, Ph.D. (Catholic Univ.) Head of Dept., Villa Madonna Coll., Covington, Ky. *Villa Madonna Convent, R.R. 2, Box 33*
THULLEN, Prof. PETER, Ph.D. (Münster, Germany) Escuela de Artillería e Ingenieros; Dir., Departmento Matemàtico Actuarial, Instituto Nacional de Previsión. *Apartado 636, Quito, Ecuador*
TILLEY, Asso. Prof. ARTHUR, Ph.D. (New York Univ.) New York Univ., New York, N.Y.
TINNER, J. C., M.S. (Chicago) Teacher, Florida A. and M. Coll., Tallahassee, Fla.
TITSWORTH, Prof. W. A., Sc.D. (Alfred) Registrar, Alfred Univ., Alfred, N.Y. *Box J-4*
TODD, JOHN, B.S. (Belfast) Lecturer, Univ. of London, King's Coll., Strand, London, W.C. 2, England. *Dept. of Math.*
TOLAR, M. B., M.S. (Kentucky) Jr. Dean, Engineering, Fenn Coll., Cleveland, Ohio
TOLLE, Prof. L. F., A.M. (St. John's Univ.) Teachers Coll., St. John's Univ., Brooklyn, N.Y. *240-23 141 Ave., Rosedale, N.Y.*
TOMPKINS, C. B., Ph.D. (Michigan) Instr., Princeton Univ., Princeton, N.J. *Lt., U.S.N.R. 110 W. Constance Ave., Santa Barbara, Calif.*
TONEY, Prof. H. S., A.M. (Ohio State) Acting Head of Dept., Wilberforce Univ., Wilberforce, Ohio. *Statistician, Materiel Command, U. S. Army Air Forces. 316 E. Church St., Xenia, Ohio*
TOOPS, Prof. H. A., Ph.D. (Columbia) Psych., Ohio State Univ., Columbus, Ohio
TOPEL, Prof. B. J., Ph.D. (Notre Dame) Carroll Coll., Helena, Mont.
TOPP, C. W., A.M. (Illinois) *Ensign, U.S.N.R., Dept. of Communications, Washington, D.C. 3800 Porter St. N.W., Washington 16, D.C.*

TORALBALLA, L. V., Ph.D. (Michigan) Instr., Michigan State Coll., East Lansing, Mich. *1109 Willard St., Ann Arbor, Mich.*
TORRANCE, Asst. Prof. C. C., Ph.D. (Cornell) Case School of Appl. Sci., Cleveland, Ohio. *3607 Randolph Road, Cleveland 21, Ohio*
TORREY, Prof. MARIAN M., Ph.D. (Cornell) Goucher Coll., Baltimore, Md. *Mary Fisher Hall, Towson, Md.*
TRACEY, Asso. Prof. J. I., Ph.D. (Johns Hopkins) Yale Univ., New Haven, Conn. *84 McKinley Ave.*
TREIBER, H. I., A.B. (Brooklyn) Jr. Physicist, Newark Signal Corps Inspection Zone. *601 Brighton Beach Ave., Brooklyn, N.Y.*
TREMBLAY, Prof. ALTHÉOD, M.A. (Laval) Laval Univ., Quebec, P.Q., Can. *367 St. Cyrille St.*
TRIGG, C. W., A.M., M.S. (Southern California) Instr., Los Angeles City Coll., Los Angeles, Calif. *Lt., U.S.N.R., Instr., U.S. Navy Pre-Flight School, Chapel Hill, N.C.*
TRIMBLE, Asst. Prof. H. C., Ph.D. (Wisconsin) Iowa State Teachers Coll., Cedar Falls, Iowa
TRIPP, Prof. M. O., Ph.D. (Columbia) Emeritus, Wittenberg Coll., Springfield, Ohio. *218 W. Cecil St.*
TRUMP, Asso. Prof. P. L., Ph.D. (Wisconsin) Teaching of Math., Univ. of Wisconsin, Madison, Wis. *2230 Rugby Row*
TUCKER, Asso. Prof. A. W., Ph.D. (Princeton) Princeton Univ., Princeton, N.J. *Fine Hall*
TUCKER, Dean B. A., A.M. (Millsaps Coll.) Head of Dept., Southeastern Louisiana Coll., Hammond, La.
TUCKER, Asst. Prof. C. B., M.S. (Brown) State Teachers Coll., Emporia, Kans.
TUCKER, R. E., A.B. (Macalester) Instr., Arizona State Coll., Flagstaff, Ariz. *Clark Homes 42D*
TUKEY, Asst. Prof. J. W., Ph.D. (Princeton) Princeton Univ., Princeton, N.J. *Fine Hall*
TUNELL, GEORGE, Ph.D. (Harvard) Memb. of staff, Geophysical Lab., Carnegie Institution of Washington, 2801 Upton St., Washington 8, D.C.
TURNER, Prof. A. B., Ph.D. (Pennsylvania) Emeritus, Coll. of the City of New York, New York, N.Y. *245 N. Mountain Ave., Upper Montclair, N.J.*
TURNER, Prof. BIRD M., Ph.D. (Bryn Mawr) West Virginia Univ., Morgantown, W.Va. *354 Spruce St.*
TURNER, Mrs. LOIS K., M.S. (Virginia Poly. Inst.) Instr., University High School, Univ. of Minnesota, Minneapolis, Minn. *815 Fulton St. S.E.*
TURRITTIN, Asst. Prof. H. L., Ph.D. (Wisconsin) Math. and Mech., Univ. of Minnesota, Minneapolis, Minn. *4046 Beard Ave. S.*

UHLER, Prof. H. S., Ph.D. (Johns Hopkins) Emeritus, Physics, Yale Univ., New Haven. Conn. *33 Edgewood Ave.*
ULLSVIK, B. R., Ph.D. (Wisconsin) Instr., State Teachers Coll., Eau Claire, Wis.
ULMER, Asst. Prof. GILBERT, Ph.D. (Kansas) Educ. and Math.; Asst. Dean, Coll. of Liberal Arts and Sci., Univ. of Kansas, Lawrence, Kans.
ULRICH, F. E., Ph.D. (Harvard) Instr., Rice Inst., Houston, Tex.
UNDERHILL, Asso. Prof. A. L., Ph.D. (Chicago) Univ. of Minnesota, Minneapolis, Minn. *126 Folwell Hall*
UNDERWOOD, P. H. Teacher, Retired, Ball High School, Galveston, Tex. *2022 W. Alabama Ave., Houston, Tex.*
UNDERWOOD, Prof. R. S., Ph.D. (Chicago) Texas Tech. Coll., Lubbock, Tex. *Box 23, Tech. Sta.*
UPTON, Prof. C. B., A.M. (Columbia) Emeritus, Teachers Coll., Columbia Univ., New York 27, N.Y.
URNER, S. E., Ph.D. (Harvard) Instr., Los Angeles City Coll., Los Angeles 27, Calif. *831 N. Mariposa Ave.*
UTZ, W. R., A.M. (Missouri) Instr., Univ. of Notre Dame, Notre Dame, Ind.

VALUCKAS, Mrs. CAROL C., A.M. (Cornell) Asst., Univ. of New Mexico, Albuquerque, N.M. *205 S. Terrace St.*
VAN ARKEL, G. H., M.S. (Washington) Instr., Centralia Jr. Coll., Centralia, Wash. *Instr., Physics Dept., Univ. of Washington, Seattle, Wash. 2003 East 47 St.*
VAN ARNAM, Asst. Prof. R. N., M.S. (Cornell) Math. and Astr., Lehigh Univ., Bethlehem, Pa. *705 First Ave.*
VAN BUSKIRK, Prof. H. C., Ph.B. (Cornell) Emeritus, California Inst. of Tech., Pasadena 5, Calif. *390 S. Holliston Ave.*
VANCE, E. P., Ph.D. (Michigan) Visiting Lecturer, Oberlin Coll., Oberlin, Ohio. *155 Elm St.*
VANDIVER, Prof. H. S. Univ. of Texas, Austin, Tex.
VAN ENGEN, Asst. Prof. HENRY, Ph.D. (Michigan) Head of Dept., Iowa State Teachers Coll., Cedar Falls, Iowa

VAN HOOK, Asso. Prof. B. O., A.M. (Vanderbilt) Millsaps Coll., Jackson, Miss.
VAN HORN, Prof. C. E., Ph.D. (Chicago) Fisk Univ., Nashville, Tenn. *916-17th Ave. N., Nashville 8, Tenn.*
VAN ORSTRAND, C. E., M.S. (Michigan) Geophysicist, Retired, U. S. Geol. Survey, Washington, D.C. *3906 Morrison St. N.W.*
VAN SCHAACK, Asst. Prof. G. B., Ph.D. (Harvard) Michigan State Coll., East Lansing, Mich. *Lt. (j.g.), U.S.N.R. R.D., Coxsackie, N.Y.*
VAN VOORHIS, Asst. Prof. W. R., Ph.D. (Pennsylvania State) Fenn Coll., Cleveland, Ohio. *1st Lt., Army Air Force; Instr., Army Air Field, Pecos, Tex.*
VARINEAU, V. J., Ph.D. (Wisconsin) Instr., Univ. of Wyoming, Laramie, Wyo. *Lt. (j.g.), U.S.N.R., Postgrad. School, U. S. Naval Acad., Annapolis, Md.*
VARNHORN, MARY C., Ph.D. (Catholic Univ.) Instr., Trinity Coll., Washington, D.C. *1120 Poplar Grove Ave., Baltimore 16, Md.*
VASS, J. I., Ph.D. (Wisconsin) Instr., Univ. of Wisconsin at Milwaukee, Milwaukee, Wis. *5141 N. Santa Monica Blvd.*
VAUGHAN, H. E., Ph.D. (Michigan) Asso., Univ. of Illinois, Urbana, Ill. *907 S. Vine St.*
VEATCH, Asso. Prof. R. W., A.M. (Northwestern) Univ. of Tulsa, Tulsa, Okla.
VEBLEN, Prof. OSWALD, Ph.D. (Chicago) Inst. for Advanced Study, Princeton, N.J. *58 Battle Road*
VEDOVA, G. C., Ph.D. (Maryland) Visiting Asso. Prof., Haverford Coll., Haverford, Pa.
VEHSE, Asso. Prof. C. H., Ph.D. (Brown) West Virginia Univ., Morgantown, W.Va.
VEST, Asst. Prof. M. L., A.M. (Michigan), M.S. (West Virginia) West Virginia Univ., Morgantown, W.Va. *Dept. of Math.*
VON NEUMANN, Prof. JOHN, Ph.D. (Budapest), Ing.Chem. (Zürich) Inst. for Advanced Study, Princeton, N.J. *Fine Hall*

WADE, T. L., Jr., Ph.D. (Virginia) Head of Dept., Florida State Coll. for Women, Tallahassee, Fla. *1003 Washington St.*
WAGNER, R. W., Ph.D. (Michigan) Instr., Oberlin Coll., Oberlin, Ohio. *Lt. (j.g.), U.S.N.R., U. S. Naval Acad., Annapolis, Md. 403 Dream's Landing*
WAGNER, W. J., Ph.D. (Pittsburgh) Lecturer, Univ. of Pittsburgh; Teacher, Allderdice High School, Pittsburgh, Pa. *Dept. of Math., Univ. of Pittsburgh*
WAHLERT, H. E., A.M. (Princeton) Instr., Washington Square Coll., New York Univ., New York, N.Y. *50 Strickland Pl., Manhasset, N.Y.*
WAHLIN, Prof. G. E., Ph.D. (Yale) Univ. of Missouri, Columbia, Mo. *1401 Anthony St.*
WAIDER, K. J., A.M. (California) Instr., Physics, Univ. of San Francisco, 2130 Fulton St., San Francisco, Calif.
WAKERLING, Asst. Prof. R. K., Ph.D. (California) Fresno State Coll., Fresno, Calif. Government research work, Univ. of California. *2834 Derby St., Berkeley 5, Calif.*
WALBERT, Brother LADISLAUS, B.S. (St. Mary's) Instr., Christian Brothers Coll., 656 E. Parkway S., Memphis, Tenn.
WALDER, Asso. Prof. O. E., A.M. (Nebraska) South Dakota State Coll., Brookings, S.D. *College Station*
WALKER, G. L., Ph.D. (Cornell) Instr., Univ. of Delaware, Newark, Del.
WALKER, Prof. HELEN M., Ph.D. (Columbia) Educ., Teachers Coll., Columbia Univ., 525 West 120 St., New York, N.Y.
WALKER, L. A., A.M. (Stanford) Teacher, Math. and Physics, High School, San Mateo, Calif. *234 Seventh Ave., Apt. 3*
WALKER, Asst. Prof. R. J., Ph.D. (Princeton) Cornell Univ., Ithaca, N.Y. *Mathematician, Ballistic Research Lab., Aberdeen Proving Ground, Md.*
WALL, Asso. Prof. H. S., Ph.D. (Wisconsin) Northwestern Univ., Evanston, Ill.
WALLACE, Asst. Prof. A. D., Ph.D. (Virginia) Univ. of Pennsylvania, Philadelphia 4, Pa. *Sunderland Court, 35th and Powelton Ave.*
WALLACH, ISRAEL, M.S. (New York Univ.) Teacher, Thomas Jefferson High School, Brooklyn, N. Y. *816 St. John's Place*
WALLICK, E. E., Ed.M. (Temple Univ.) Teacher, Senior High School, Lakewood, N.J. *521 Princeton Ave.*
WALLIS, WILLIAM, A.B. (Texas Tech.) Instr., Eastern New Mexico Coll., Portales, N.M.
WALSH, Prof. J. L., Ph.D. (Harvard) Harvard Univ., Cambridge, Mass. *Lt. Commander, U.S.N.R. 474 Widener Library, Cambridge, Mass.*
WALTER, Asst. Prof. R. M., A.M. (Columbia) New Jersey Coll. for Women, New Brunswick, N.J.
WALTON, Prof. T. O., Ph.D. (Michigan) Kalamazoo Coll., Kalamazoo, Mich.
WALTZ, Asso. Prof. A. K., Ph.D. (Cornell) Clarkson Coll., Potsdam, N.Y. *52 Bay St.*
WAPPLE, A. R., A.M. (California) Instr., A. and M. Coll. of Texas, College Station, Tex. *Box 1723*
WARD, Prof. J. A., Ph.D. (Wisconsin) Head of Dept., Delta State Teachers Coll., Cleveland, Miss. *Lt. (j.g.), U.S.N.R., 1317 Logan St., Corpus Christi, Tex.*
WARD, Asso. Prof. L. E., Ph.D. (Harvard) Univ. of Iowa, Iowa City, Iowa. *209 Physics Bldg.*

WARD, Prof. MORGAN, Ph.D. (Calif. Inst. of Tech.) California Inst. of Tech., Pasadena, Calif.
WARDWELL, J. F., Ph.D. (Johns Hopkins) Instr., Colgate Univ., Hamilton, N.Y.
WARNOCK, Asst. Prof. W. G., Ph.D. (Illinois) Univ. of Alabama, University, Ala.
WARREN, K. L., Ph.D. (Mich. State Coll.) Chm., Physical Sci., Univ. of Grand Rapids, Grand Rapids, Mich. *Lt., U.S.N.R.*
WARREN, Prof. L. A. H., Ph.D. (Chicago) Actuarial Sci., Univ. of Manitoba, Winnipeg, Man., Can. *64 Niagara St.*
WASHBURNE, A. C., Grad. (U. S. Milit. Acad.) Actuary Emeritus, Berkshire Life Ins. Co., Pittsfield, Mass. *134 E. Housatonic St.*
WATKEYS, Prof. C. W., A.M. (Harvard) Univ. of Rochester, Rochester, N.Y. *287 Dartmouth St.*
WATSON, G. C., A.M. (Virginia) Address Unknown
WATT, Asso. Prof. MARTHA W., A.M. (Columbia) Head of Dept., Wheaton Coll., Norton, Mass. *2144 Broad St., Providence 5, R.I.*
WATTS, C. B., A.B. (Indiana) Astronomer, U. S. Naval Observatory, Washington, D.C.
WAYNE, ALAN, M.S. in Educ. (C.C.N.Y.) Instr., Rhodes School, New York, N.Y. *141-21 78th Road, Flushing, N.Y.*
WEAR, Asso. Prof. L. E., Ph.D. (Johns Hopkins) California Inst. of Tech., Pasadena, Calif. *2247 Lambert Drive*
WEAVER, C. L., B.S. (Kent State Univ.) Asst. Actuary, New England Mut. Life Ins. Co., 501 Boylston St., Boston, Mass.
WEAVER, WARREN, Ph.D. (Wisconsin) Dir. for the Natural Sciences, Rockefeller Foundation, New York, N.Y. *Chief, Applied Math. Panel, N.D.R.C. 160 Brite Ave., Scarsdale, N.Y.*
WEBB, Asso. Prof. D. L., Ph.D. (Calif. Inst. of Tech.) Texas Tech. Coll., Lubbock, Tex. *Dept. of Math.*
WEBSTER, Asst. Prof. M. S., Ph.D. (Pennsylvania) Purdue Univ., Lafayette, Ind.
WEDDERBURN, Prof. J. H. M., D.Sc. (Edinburgh) Princeton Univ., Princeton, N.J. *Fine Hall*
WEDEL, E.B., A.M. (Oklahoma) Instr., Univ. of Wichita, Wichita, Kans. *R.R. 2, Box 74, Newton, Kans.*
WEEBER, Asst. Prof. MARGARET C., A.M. (Chicago) Teachers Coll. of Connecticut, New Britain, Conn.
WEGNER, Asso. Prof. K. W., Ph.D. (Wisconsin) Carleton Coll., Northfield, Minn.
WEHAUSEN, J. V., Ph.D. (Michigan) Instr., Univ. of Missouri, Columbia, Mo. *Dept. of Math.*
WEIDA, Prof. F. M., Ph.D. (Iowa) Head of Dept. of Statistics, George Washington Univ., Washington, D.C.
WEISNER, Asso. Prof. LOUIS, Ph.D. (Columbia) Hunter Coll., 695 Park Ave., New York, N.Y.
WEISS, Prof. MARIE J., Ph.D. (Stanford) Sophie Newcomb Coll., New Orleans 18, La.
WELCH, HARRIET A., M.L. (California) Head of Dept., Lowell High School, San Francisco, Calif. *1950 Jones St.*
WELCHONS, A. M., A.M. (Bucknell) Head of Dept., Arsenal Tech. Schools, Indianapolis, Ind. *509 N. Drexel Ave.*
WELKER, Asst. Prof. FERN, A.M. (Toledo) Univ. of Toledo, Toledo, Ohio
WELLS, Prof. AGNES E., Ph.D. (Michigan) Indiana Univ., Bloomington, Ind. *420 N. Indiana Ave.*
WELLS, E. D., A.M. (Minnesota) 7415 Penfield Court, Pittsburgh, Pa.
WELLS, Prof. MARY EVELYN, Ph.D. (Chicago) Vassar Coll., Poughkeepsie, N. Y.
WELLS, N. W., A.M. (Rice) Instr., Physics, New Mexico State Coll., State College, N.M.
WELLS, Prof. V. H., Ph.D. (Michigan) Williams Coll., Williamstown, Mass. *3 Chapin Court*
WELMERS, Asst. Prof. E. T., Ph.D. (Michigan) Michigan State Coll., East Lansing, Mich. *Dept. of Math.*
WENTE, IRENE L., M.S. (Chicago) Instr., South Dakota State Coll., Brookings, S.D.
WESCOTT, Asst. Prof. M. E., Ph.D. (Northwestern) Northwestern Univ., Evanston, Ill. *1936 Greenwood Ave., Wilmette, Ill.*
WEST, ADA H., A.M. (Kansas) 615 N. Hennepin Ave., Dixon, Ill.
WESTBROOK, H. S. *1st Lt., U.S.A.*
WESTFALL, Prof. W. D. A., Ph.D. (Göttingen) Univ. of Missouri, Columbia, Mo. *11 S. Glenwood Ave.*
WESTHAFER, R. L., Ph.D. (Ohio State) *Lt., U.S.N.R.*
WETZIG, C. U., A.M. (Texas) Instr., Arkansas A. and M. Coll., Magnolia, Ark.
WEXLER, Prof. CHARLES, Ph.D. (Harvard) Arizona State Teachers Coll., Tempe, Ariz. *1st Lt., Signal Corps, 5708 N. 11th Road, Arlington, Va.*
WEYL, F. J., Ph.D. (Princeton) Instr., Indiana Univ., Bloomington, Ind. *1216 E. Hunter Ave.*
WHEELER, A. H., A.M. (Clark) Prof. Affiliate, Clark Univ., Worcester, Mass. *44 Beverly Road*

WHEELER, Mrs. ANNA PELL, Ph.D. (Chicago) Prof., Bryn Mawr Coll., Bryn Mawr, Pa. *Low Buildings*

WHEELER, Prof. C. H. III, Ph.D. (Johns Hopkins) Treas., Univ. of Richmond, Richmond, Va.

WHEELER, Asso. Prof. J. J., A.M. (Kansas) Univ. of Kansas, Lawrence, Kans. *1024 Alabama St.*

WHELAN, Asst. Prof. A. MARIE, Ph.D. (Johns Hopkins) Hunter Coll., New York, N.Y.

WHETSTONE, G. A., Ph.D. (Washington) Instr., Math. and Engg., Amarillo Coll., Amarillo, Tex.

WHITE, Prof. A. E., M.S. (Purdue) Kansas State Coll., Manhattan, Kans.

WHITE, Dean E. V., A.M. (Baylor) Dir. of Dept., State Coll. for Women, Denton, Tex.

WHITE, MARELENA, M.S. (Louisiana) Asst., Louisiana State Univ., University Sta., Baton Rouge, La. *Dept. of Math.*

WHITE, MARION B., Ph.D. (Chicago) Retired, 1949 Woodlyn Road, Pasadena 7, Calif.

WHITE, R. L., A.B. (U.C.L.A.) *Lt. (j.g.), U.S.N.R. 2122 W. Washington Blvd., Los Angeles 7, Calif.*

WHITED, WILLIS, D.Eng. (Iowa State) Consulting Bridge Engr., Retired, State Highway Dept., Harrisburg, Pa. *1407 Market St.*

WHITFORD, Prof. A. E., A.M. (Wisconsin) Dean, Coll. of Lib. Arts, Alfred Univ., Alfred, N.Y.

WHITFORD, Asst. Prof. D. E., A.M. (Brown), Ed.M. (Harvard) Poly. Inst. of Brooklyn, Brooklyn, N.Y. *85-99 Livingston St.*

WHITFORD, Prof. E. E., Ph.D. (Columbia) Emeritus, Coll. of the City of New York, New York, N.Y. *Brookfield, N.Y.*

WHITING, MABEL G., A.M. (Oberlin) Registrar and Teacher, Jr. Coll., Santa Ana, Calif. *506 E. Chestnut Ave.*

WHITMAN, Asso. Prof. E. A., A.M. (Pittsburgh) Carnegie Inst. of Tech., Pittsburgh, Pa. *521 Locust St., Edgewood*

WHITMAN, P. M., Ph.D. (Harvard) Instr., Univ. of Pennsylvania, Philadelphia 4, Pa. *College Hall*

WHITNEY, ANNA M., A.M. (Columbia) Head of Dept., High School, Yakima, Wash. *203 S. Eighth Ave.*

WHITNEY, D. R., A.M. (Princeton) *Lt. (j.g.), U.S.N.R., 1732 Riverside Drive, Trenton, N.J.*

WHITTED, Prof. J. A., A.M. (Southwestern) Emeritus, Ohio Northern Univ., Ada, Ohio. *75 Forest Ave., Delaware, Ohio*

WHITTEMORE, Asso. Prof. J. K., A.M. (Harvard) Retired, Yale Univ., New Haven, Conn. *45 Lincoln St.*

WHYBURN, Prof. G. T., Ph.D. (Texas) Chm. of Dept., Univ. of Virginia, Charlottesville, Va. *Colonnade Club*

WHYBURN, Prof. W. M., Ph.D. (Texas) Univ. of California at Los Angeles, Los Angeles 24, Calif. *715 Malcolm Ave.*

WICHT, M. C., A.M. (Vanderbilt) Address unknown

WICKER, B. R., A.M. (Nebraska) Instr., Loyola Univ. of Los Angeles, Los Angeles, Calif.

WIDDER, Prof. D. V., Ph.D. (Harvard) Harvard Univ., Cambridge, Mass. *572 Widener Library*

WIEGAND, J. T., B.E. (Chicago T. C.) Instr., Illinois Inst. of Tech., Chicago, Ill. *7840 Jeffery Ave.*

WIGGIN, Prof. EVELYN P., Ph.D. (Chicago) Randolph-Macon Woman's Coll., Lynchburg, Va.

WILCOX, Asso. Prof. L. R., Ph.D. (Chicago) Illinois Inst. of Tech., 3300 S. Federal St., Chicago, Ill.

WILCZEWSKI, Rev. JOSEPH, Ph.D. (St. Louis Univ.) Prof., Marquette Univ., Milwaukee, Wis. *1131 Wisconsin Ave.*

WILDER, Prof. C. E., Ph.D. (Harvard) Dartmouth Coll., Hanover, N.H.

WILDER, Prof. R. L., Ph.D. (Texas) Univ. of Michigan, Ann Arbor, Mich. *1617 Cambridge Rd.*

WILDERMUTH, Prof. R. B., A.M. (Ohio State) Capital Univ., Columbus, Ohio. *2285 E. Mound St.*

WILEY, Prof. F. B., Ph.D. (Chicago) Head of Dept., Denison Univ., Granville, Ohio. *Box 476*

WILEY, Prof. J. W., A.M. (Michigan) Math. and Physics, Anderson Coll. and Theolog. Seminary, Anderson, Ind. *826 Myers Ave.*

WILKINS, Prof. P. D., M.S. (Case) Bates Coll., Lewiston, Me. *420 College St.*

WILKS, Asso. Prof. S. S., Ph.D. (Iowa) Princeton Univ., Princeton, N.J. *Fine Hall*

WILLIAMS, Asst. Prof. A. R., Ph.D. (California) Univ. of California, Berkeley, Calif. *455 Wheeler Hall*

WILLIAMS, Asst. Prof. ERNEST, A.M. (Michigan) Alabama Poly. Inst., Auburn, Ala. *452 W. Magnolia Ave.*

WILLIAMS, Prof. F. G., Ph.D. (Cornell) Registrar, Pennsylvania Milit. Coll., Chester, Pa. *Lecturer, Swarthmore Coll., Swarthmore, Pa. 608 University Pl., Swarthmore, Pa.*

WILLIAMS, Asso. Prof. G. A., A.M. (California) Oregon State Coll., Corvallis, Ore. *306 N. 32nd St.*
WILLIAMS, Asst. Prof. H. W., A.M. (Missouri) Colorado State Coll. of A. and M. A., Fort Collins, Colo. *Dept. of Math.*
WILLIAMS, JOSEPHINE J., A.M. (Radcliffe) Teacher, The Baldwin School, Bryn Mawr, Pa. *York Road, Jenkintown, Pa.*
WILLIAMS, Prof. K. P., Ph.D. (Princeton) Indiana Univ., Bloomington, Ind.
WILLIAMS, Prof. W. L., Ph.D. (Chicago) Head of Dept., Univ. of South Carolina, Columbia, S.C.
WILLIAMSON, Prof. C. O., Ph.D. (Chicago) Acting Head of Dept., Coll. of Wooster, Wooster, Ohio. *Lt., C. A. P. 1141 Beall Ave., Wooster, Ohio*
WILLIAMSON, Asso. Prof. JOHN, Ph.D. (Chicago) Queens Coll., Flushing, N.Y.
WILSON, Prof. A. H., Ph.D. (Chicago) Emeritus, Haverford Coll., Haverford, Pa.
WILSON, Prof. E. B., Ph.D. (Yale) Vital Statistics, Harvard Univ., 55 Shatuck St., Boston 15, Mass.
WILSON, G. H., Ph.D. (Pennsylvania) Instr., Physics, Univ. of Pennsylvania, Philadelphia, Pa. *N. Rockland Road, Merion, Pa.*
WILSON, HAZEL S. (Mrs. L. T.), Ph.D. (Cornell) 20 Thompson St., Annapolis, Md.
WILSON, Prof. N. R., Ph.D. (Chicago) Univ. of Manitoba, Winnipeg, Man., Can.
WILSON, R. H., Jr., Ph.D. (Pennsylvania) Jr. Astronomer, U. S. Naval Observ., Nautical Almanac Office, Washington, D.C. *Lt., U.S.N.R., Instr., U. S. Naval Acad., Annapolis, Md. Dept. of Math.*
WILSON, Prof. W. A., Ph.D. (Yale) Yale Univ., New Haven, Conn. *1960 Chapel St.*
WILSON, W. E., Ph.D. (Iowa) Research Engr., Armour Research Foundation, Chicago, Ill. *1452 Scott Ave., Winnetka, Ill.*
WILSON, Prof. W. H., Ph.D. (Illinois) Asso. Dean, Coll. of Arts and Sci., Univ. of Florida, Gainesville, Fla. *Box 2227 Univ. Sta.*
WILTON, Prof. J. R., M.A. (Cantab.) Univ. of Adelaide, Adelaide, South Australia
WINGER, Prof. R. M., Ph.D. (Johns Hopkins) Univ. of Washington, Seattle, Wash.
WINKELMANN, Rev. G. L., M.S. (Chicago) St. John's Univ., Collegeville, Minn.
WINN, W. F. Instr., Army Air Force Training School. *130 S. Duluth Ave, Sioux Falls, S.D.*
WINSTON, CLEMENT, Ph.D. (Pennsylvania) Principal Industrial Economist, War Production Board, Washington, D.C. *1420 Tuckerman St., Washington 11, D.C.*
WIRTH, Asst. Prof. H. P., Ph.D. (New York Univ.) Coll. of the City of New York, 139th St. and Convent Ave., New York, N.Y.
WOLF, FRANTISEK, Ph.D. (Masaryk Univ.) Instr., Univ. of California, Berkeley, Calif. *Box 49, W, U. of C.*
WOLF, Asst. Prof. LOUISE A., Ph.D. (Wisconsin) Univ. of Wisconsin Exten. Div., Milwaukee, Wis. *3700 South 116 St., West Allis Sta.*
WOLFE, ALBERTA, M.S. (Iowa State Coll.) Instr., Miami Univ., Oxford, Ohio. *12 N. Beech St.*
WOLFE, CLYDE, Ph.D. (California) Mathematician, Radiation Lab., Univ. of California, Berkeley, Calif. *1009 Miller Ave.*
WOLFE, C. H., A.M. (Ohio Wesleyan Univ.) Asst. Supt., Danbury High School, Lakeside, Ohio
WOLFE, Asso. Prof. H. E., Ph.D. (Indiana) Indiana Univ., Bloomington, Ind. *812 S. Fess Ave.*
WOLFE, JACK, Ph.D. (New York Univ.) Instr., Brooklyn Coll., Bedford Ave. and Avenue H, Brooklyn 10, N.Y.
WOLFE, R. S., A.M. (Washington) Instr., Northwestern Univ., Evanston, Ill. *Dept. of Math.*
WONG, Asso. Prof. B. C., Ph.D. (California) Univ. of California, Berkeley, Calif.
WOOD, Prof. FREDRICK, Ph.D. (Wisconsin) Dean, Coll. of Arts and Sci., Univ. of Nevada, Reno, Nev.
WOOD, Asso. Prof. F. E., Ph.D. (Chicago) Univ. of Oregon, Eugene, Ore. *Dept. of Math.*
WOOD, Asso. Prof. F. M., M.A. (Queen's) Civil Engg., McGill Univ., Montreal, P.Q., Can. *Engineering Bldg.*
WOOD, H. A., Ph.D. (Mass. Inst. of Tech.) Research Mathematician, Chance Vought Aircraft, Stratford, Conn. *1843 Elm St.*
WOOD, J. E., A.M. (Colo. State Coll. of Educ.) Address unknown
WOODBRIDGE, MARGARET Y., J.D. (New York Univ.) Instr., Brooklyn Coll., Brooklyn, N.Y. *169 Columbia Heights, Brooklyn 2, N.Y.*
WOODS, C. L., M.S. (Cincinnati) Asst., Ohio State Univ., Columbus, Ohio. *1487 Belmont Ave.*
WOODS, Prof. F. S., Ph.D. (Göttingen) Emeritus, Massachusetts Inst. of Tech., Cambridge, Mass. *123 Sumner St., Newton Centre, Mass.*
WOODS, Asso. Prof. ROSCOE, Ph.D. (Illinois) Acting Head of Dept., Univ. of Iowa, Iowa City, Iowa
WOODSON, Prof. G. F., Jr., A.M. (Ohio State) Head of Dept., Johnson C. Smith Univ., Charlotte, N.C.
WOOLARD, E. W., Ph.D. (George Washington) Meteorologist, U. S. Weather Bureau, Washington, D.C. *1232-30th St. N.W., Washington 7, D.C.*

WORTHINGTON, Asst. Prof. EUPHEMIA R., Ph.D. (Yale) Univ. of California at Los Angeles, Los Angeles, Calif.
WRAY, W. D., Ph.D. (Cornell) U. S. Navy Dept., Washington, D.C. *R.D. 2, Box 375, Alexandria, Va.*
WREN, Prof. F. L., Ph.D. (Chicago) Teaching of Math., George Peabody Coll., Nashville, Tenn.
WRENCH, J. W., Jr., Ph.D. (Yale) Asst. Mathematician, Geophysical Lab., Carnegie Institution of Washington, Washington, D.C. *4711 Davenport St. N.W., Washington 16, D.C.*
WRESTLER, FERNA E., A.M. (Kansas) Instr., Jr. Coll., El Dorado, Kans.
WRIGHT, Mrs. ALICE KELSEY, A.M. (Illinois) Asst. Prof., Southern Illinois Normal Univ., Carbondale, Ill. *804 W. Main St.*
WRIGHT, FRANCES M., A.M. (Brown) Tech. Aide, Office of Scientific Personnel, Natl. Res. Council, Washington 25, D.C. *2103-18th St. N., Arlington, Va.*
WRIGHT, Prof. H. A., Ph.D. (New York Univ.) Transylvania Coll., Lexington, Ky.
WRIGHT, Prof. H. N., Ph.D. (California) Pres., Coll. of the City of New York, New York, N.Y.
WYCKOFF, J. F., A.M. (Yale) Instr., Trinity Coll., Hartford, Conn.
WYLIE, Prof. C. C., Ph.D. (Illinois) Astr., Univ. of Iowa, Iowa City, Iowa
WYLIE, Asst. Prof. C. R., Jr., Ph.D. (Cornell) Ohio State Univ., Columbus, Ohio. *Mathematician, Propeller Labs., Wright Field, Dayton, Ohio. Dept. of Math., Ohio State Univ.*

YANNEY, Prof. B. F., Ph.D. (Chicago) Emeritus, Coll. of Wooster, Wooster, Ohio. *354 E. Bowman St.*
YANOSIK, Asso. Prof. G. A., C.E. (New York Univ.) New York Univ., New York, N.Y. *52 Greenvale Ave., Yonkers, N.Y.*
YARBROUGH, H. M., Ph.D. (Indiana) Head of Dept., Western Kentucky State Teachers Coll., Bowling Green, Ky. *Route No. 4*
YATES, R. C., Ph.D. (Johns Hopkins) *Major, A.U.S., U. S. Military Acad., West Point, N.Y. Dept. of Math.*
YEAGER, E. N., M.S. (Notre Dame) Priorities Supervisor, Napoleon Products Co., Napoleon, Ohio. *714 Monroe St.*
YEATON, Prof. C. H., Ph.D. (Chicago) Oberlin Coll., Oberlin, Ohio. *189 Forest St.*
YEATON, Asso. Prof. MARIE M. (Mrs. C. H.), Ph.D. (Chicago) Oberlin Coll., Oberlin, Ohio. *189 Forest St.*
YOOD, BERTRAM, M.S. (Calif. Inst. of Tech.) *Lt. (j.g.), U.S.N.R. 3645 Horner Place, S.E., Washington, D.C.*
YOUNG, G. J., M.S. (Chicago) Research Asso., Univ. of Chicago, Chicago, Ill. *208 Eckhart Hall*
YOUNG, Asso. Prof. J. W. A., Ph.D. (Clark) Emeritus, Univ. of Chicago, Chicago, Ill. *5422 Blackstone Ave.*
YOUNG, Prof. MABEL M., Ph.D. (Johns Hopkins) Emeritus, Wellesley Coll., Wellesley, Mass. *6 Norfolk Ter.*
YOUNG, P. M., Ph.D. (Ohio State) *Ensign, U.S.N.R., Instr., Midshipmen's School, New York, N.Y. 400 West 119 St.*
YOWELL, Prof. E. I., Ph.D. (Cincinnati) Dir., Emeritus, Cincinnati Observatory, Univ. of Cincinnati, Cincinnati, Ohio. *3127 Griest Ave.*

ZANOLAR, A. J., M.S. (Catholic Univ.) Instr., St. Joseph's Coll., Collegeville, Ind.
ZANT, Prof. J. H., Ph.D. (Columbia) Acting Head of Dept., Oklahoma A. and M. Coll., Stillwater, Okla.
ZARISKI, Prof. OSCAR, Ph.D. (Rome) Johns Hopkins Univ., Baltimore, Md.
ZELDIN, Asst. Prof. S. D., Ph.D. (Clark) Massachusetts Inst. of Tech., Cambridge, Mass. *Dept. of Math.*
ZIEROFF, Sister GERTRUDE MARIE, M.S. (St. Louis Univ.) Instr., Marian Coll., 3600 Cold Springs Road, Indianapolis, Ind.
ZIMMERMAN, B. C., A.M. (St. Louis Univ.) Missionary, Catholic Presbytery, Belize, British Honduras
ZOCH, R. T., A.M. (George Washington) Asso. Statistician, U. S. Weather Bureau, Washington, D.C.
ZORN, Asso. Prof. M. A., Dr.res.mat. (Hamburg) Univ. of California at Los Angeles, Los Angeles, Calif.
ZUCKERMAN, Asst. Prof. H. S., Ph.D. (California) Univ. of Washington, Seattle 5, Wash.

INSTITUTIONAL MEMBERS

Allegheny College, Meadville, Pa.
Amherst College, Amherst, Mass.

Bethany College, Bethany, W.Va.
Boston University, Boston, Mass.
Brown University, Providence, R.I.
Bryn Mawr College, Bryn Mawr, Pa.

Carleton College, Northfield, Minn.
Carnegie Institute of Technology, Pittsburgh, Pa.
Case School of Applied Science, Cleveland, Ohio
College of Chestnut Hill, Philadelphia, Pa.
College of the City of New York, New York, N.Y.
College of the Holy Cross, Worcester, Mass.
College of Mount St. Vincent, Mount St. Vincent-on-Hudson, N.Y.
College of St. Teresa, Winona, Minn.
College of William and Mary, Williamsburg, Va.
College of Wooster, Wooster, Ohio
Columbia University, New York, N.Y.
Cooper Union, New York, N.Y.
Creighton University, Omaha, Nebr.

Dartmouth College, Hanover, N.H.
Denison University, Granville, Ohio
De Paul University, Chicago, Ill.
Drexel Institute of Technology, Philadelphia, Pa.
D'Youville College, Buffalo, N.Y.

Eastern Illinois State Teachers College, Charleston, Ill.
Elmira College, Elmira, N.Y.
Escuela de Ingenieros Industriales, Santiago, Chile

George Peabody College for Teachers, Nashville, Tenn.
Georgia School of Technology, Atlanta, Ga.

Harvard University, Cambridge, Mass.
Hiram College, Hiram, Ohio
Hunter College of the City of New York, New York, N.Y.

Illinois Institute of Technology, Chicago, Ill.
Iowa State College, Ames, Iowa

Kansas State Teachers College, Emporia, Kans.
Kenyon College, Gambier, Ohio
Knox College, Galesburg, Ill.

Loras College, Dubuque, Iowa
Los Angeles City College, Los Angeles, Calif.
Louisiana Polytechnic Institute, Ruston, La.
Louisiana State University, Baton Rouge, La.
Loyola College, Baltimore, Md.
Luther College, Decorah, Iowa

Manhattanville College of the Sacred Heart, New York, N.Y.
Marymount College, Tarrytown, N.Y.
Michigan State College, East Lansing, Mich.
Middlebury College, Middlebury, Vt.
Missouri School of Mines, Rolla, Mo.
Montana State College, Bozeman, Mont.
Montana State University, Missoula, Mont.

New Jersey College for Women, New Brunswick, N.J.
New Mexico College of A. and M.A., State College, N.M.
New York State College for Teachers, Albany, N.Y.
New York University, New York, N.Y.

NIAGARA UNIVERSITY, Niagara University, N.Y.
NORTH CAROLINA STATE COLLEGE, Raleigh, N.C.
NORTH TEXAS STATE TEACHERS COLLEGE, Denton, Tex.
NORTHWESTERN UNIVERSITY, Evanston, Ill.

OBERLIN COLLEGE, Oberlin, Ohio
OCCIDENTAL COLLEGE, Los Angeles, Calif.
OKLAHOMA A. AND M. COLLEGE, Stillwater, Okla.

PRINCETON UNIVERSITY, Princeton, N.J.
PURDUE UNIVERSITY, LaFayette, Ind.

RICE INSTITUTE, Houston, Tex.
RUTGERS UNIVERSITY, New Brunswick, N.J.

ST. AMBROSE COLLEGE, Davenport, Iowa
ST. BONAVENTURE COLLEGE, St. Bonaventure, N.Y.
ST. MARY-OF-THE-WOODS COLLEGE, St. Mary-of-the-Woods, Ind.
SANTA ROSA JUNIOR COLLEGE, Santa Rosa, Calif.
SOUTHERN METHODIST UNIVERSITY, Dallas, Tex.
STATE UNIVERSITY OF IOWA, Iowa City, Iowa
SWARTHMORE COLLEGE, Swarthmore, Pa.

UNION COLLEGE, Schenectady, N.Y.
UNIVERSITY OF AKRON, Akron, Ohio
UNIVERSITY OF BUFFALO, Buffalo, N.Y.
UNIVERSITY OF CALIFORNIA AT LOS ANGELES, Los Angeles, Calif.
UNIVERSITY OF CHICAGO, Chicago, Ill.
UNIVERSITY OF CINCINNATI, Cincinnati, Ohio
UNIVERSITY OF ILLINOIS, Urbana, Ill.
UNIVERSITY OF KANSAS, Lawrence, Kans.
UNIVERSITY OF MICHIGAN, Ann Arbor, Mich.
UNIVERSITY OF MINNESOTA, Minneapolis, Minn.
UNIVERSITY OF MONTREAL, Montreal, P.Q., Canada
UNIVERSITY OF NEBRASKA, Lincoln, Nebr.
UNIVERSITY OF NEW MEXICO, Albuquerque, N.M.
UNIVERSITY OF NOTRE DAME, Notre Dame, Ind.
UNIVERSITY OF OKLAHOMA, Norman, Okla.
UNIVERSITY OF ROCHESTER, Rochester, N.Y.
UNIVERSITY OF SOUTH CAROLINA, Columbia, S.C.
UNIVERSITY OF SOUTH DAKOTA, Vermillion, S.D.
UNIVERSITY OF TENNESSEE, Knoxville, Tenn.
UNIVERSITY OF TORONTO, Toronto, Ont., Canada
UNIVERSITY OF UTAH, Salt Lake City, Utah
UNIVERSITY OF VIRGINIA, Charlottesville, Va.
UNIVERSITY OF WICHITA, Wichita, Kans.
UNIVERSITY OF WYOMING, Laramie, Wyo.

VIRGINIA POLYTECHNIC INSTITUTE, Blacksburg, Va.

WASHINGTON AND JEFFERSON COLLEGE, Washington, Pa.
WASHINGTON UNIVERSITY, St. Louis, Mo.
WAYNE UNIVERSITY, Detroit, Mich.
WELLESLEY COLLEGE, Wellesley, Mass.
WELLS COLLEGE, Aurora, N.Y.
WESTERN RESERVE UNIVERSITY, Cleveland, Ohio
WILSON COLLEGE, Bombay, India
WORCESTER POLYTECHNIC INSTITUTE, Worcester, Mass.

YALE UNIVERSITY, New Haven, Conn.

RECAPITULATION OF MEMBERSHIP

Individual members January 14, 1944	2,378
Institutional members January 14, 1944	106
Total membership January 14, 1944	2,484

GEOGRAPHICAL DISTRIBUTION OF INDIVIDUAL MEMBERS

(The name of a member was omitted from this list when his location was unknown, or if his address was uncertain or very temporary.)

UNITED STATES

ALABAMA

AUBURN.
Alabama Poly. Inst. Doner, Dressler, Fuller, Williams.
BIRMINGHAM. Hess, Moore, Rayl.
FLORENCE. Culmer.
MONTEVALLO. Jackson.
ST. BERNARD. Capesius.
UNIVERSITY.
Univ. of Alabama. Clark, Cowan, Hummel, Kennedy, Lewis, Mancill, Ott, Seebeck, Warnock.

ARIZONA

FLAGSTAFF. Lampland, Mehlenbacher, Tucker.
PHOENIX. Harmon, Johnson, Riley.
TEMPE. Wexler.
THATCHER. Olpin.
TUCSON.
Univ. of Arizona. Boldyreff, Graesser, Hohn, Leonard, Mewborn, Purcell.

ARKANSAS

CONWAY. Lane.
FAYETTEVILLE.
Univ. of Arkansas. Adkisson, Comfort, Harding, Kent.
MAGNOLIA. Wetzig.
MONTICELLO. Garrett, Rothchild.

CALIFORNIA

BELL. Niersbach.
BERKELEY.
Univ. of California. Bernstein, Chin, Evans, Lehmer, Levy, Noble, Sperry, Williams, Wolf, Wolfe, Wong.
BRAWLEY. Beckwith.
CLAREMONT. Jaeger, Sellew.
COLTON. Battin.
COMPTON. Gorman.
DAVIS. Baker, Roessler.
FRESNO. Morris, Wakerling.
FULLERTON. Ernsberger, Reynolds.
GLENDALE. Roberts.
HAYWARD. Rahn.
HOLLYWOOD. Campbell, Hand.
INGLEWOOD. Randels.
LA JOLLA. McEwen.
LONG BEACH. Black, McClellan.
LOS ANGELES. Alexander, Collier, Gaver, Hinds, McConnell, Quilliam, Wicker.
Los Angeles City Coll. Duncan, Hills, Kaelin, Orange, Thompson, Trigg, Urner.
Univ. of California at Los Angeles. Ablow, Bell, Daus, Glazier, Hoel, Hunt, James, Mason, Puckett, Sherwood, Taylor, Thomas, Whyburn, Worthington, Zorn.
Univ. of Southern California. Ames, Rex' Robb, Steed, Throckmorton.
MADERA. Fuller.
MARYSVILLE. Miller.
OAKLAND. Hesse, Sumner.
PASADENA. White.
California Inst. of Tech. Bateman, Bell, Birchby, Dilworth, Hyers, Michal, Van Buskirk, Ward, Wear.
Pasadena Junior Coll. Damsgard, Glenn, Michael.
REDLANDS. Albert.
SAN DIEGO. Bell, Klauber, Livingston, Sheehy, Smith.
SAN FRANCISCO. Frank, Ivanoff, Phillips, Sturges, Waider, Welch.
San Francisco Junior Coll. Bass, McCarty, Skarstedt.
SANGER. Spearman.
SAN JOSE. Clarke, Heaslet, Myers.
SAN MATEO. Walker.
SANTA ANA. Whiting.
SANTA CLARA. Fitzgerald.
SANTA MONICA. Adams, Taylor.
STANFORD UNIVERSITY.
Stanford Univ. Bacon, Blichfeldt, Francis, Polya, Szegö.
STOCKTON. Corbin.
VALLEJO. Becker.
WHITTIER. Pyle.

CANAL ZONE

BALBOA HEIGHTS. McNair.

COLORADO

BOULDER.
Univ. of Colorado. Britton, Hutchinson, Kempner, Kendall, LeVeque, McMaster, Nelson.
COLORADO SPRINGS. Lovitt, Sisam.
DENVER. Duffner, Goodpasture, Sabin.
Univ. of Denver. Carmichael, Gorrell, Lewis, Recht.
FORT COLLINS.
Colorado State Coll. Clark, Guard, Gunder, Macdonald, Williams.
GOLDEN.
Colorado School of Mines. Brown, Everett, Fitterer, Hebel.
GREELEY. Mallory.
GUNNISON. Spicer.
LORETTO. Cook.

CONNECTICUT

BLOOMFIELD. Rosenbaum.
BRISTOL. Sabel.
HARTFORD. Bronstein, Dadourian, Donchian, Elston, Keffer, Kelly, Mitchell, Wyckoff.

MIDDLEBURY. Innis.
MIDDLETOWN. Arnold, Camp, Howland.
NEW BRITAIN. Fuller, Weeber.
NEW HAVEN.
Yale Univ. Begle, Dunford, Durfee, Engstrom, Hille, Kovarik, Leech, Longley, Miles, Ore, Putnam, Tracey, Uhler, Whittemore, Wilson.
NEW LONDON. Bower, Dimick, Kelly.
PUTNAM. Alfred.
SIMSBURY. Howard.
STAMFORD. Kinsman.
STORRS. Cheney.
STRATFORD. Hall, Jonah, Loring, Scherberg, Wood.
WEST HARTFORD. Pease.
WEST HAVEN. Anderton.

DELAWARE

LEWES. Short.
NEWARK.
Univ. of Delaware. Jones, McDougle, Rees, Walker.

DISTRICT OF COLUMBIA

WASHINGTON. Adams, Aitchison, Avers, Barten, Benscoter, Berry, Blake, Branson, Clark, Cromwell, Crow, Duerksen, Federico, Flaherty, Fleming, Fry, Gabrielle, Goldberg, Greville, Hamilton, Hoy, Johnson, E. L. Kaplan, S. Kaplan, Kendall, Kennedy, Lambert, Larrivee, Lloyd, Maloney, McCamman, Mertie, Moulton, Newman, Nowlan, Patterson, Pawley, Penney, Petersen, Sasuly, Schach, Schell, Schult, Scott, Shenton, Siller, Skelly, Sohon, Sollins, Spencer, Stearn, Thomas, Tunell, Van Orstrand, Varnhorn, Watts, Wilson, Winston, Woolard, Wray, Wrench, Wright, Zoch.
Catholic Univ. of America. Finan, Landry, Ramler, Rice.
George Washington Univ. Johnston, Kullbach, Mears, Quinn, Taylor, Weida.

FLORIDA

GAINESVILLE.
Univ. of Florida. Blake, Davis, Dostal, Gager, Lang, McInnis, Mead, Phipps, Simpson, Wilson.
HOLLYWOOD. Rosenbaum.
JACKSONVILLE. Reiber.
LAKELAND. Reinsch.
MIAMI BEACH. Nagle.
ST. PETERSBURG. Burt, Story.
TALLAHASSEE. Clarke, Tinner.
Florida State Coll. for Women. Larson, Smith, Wade.
TAMPA. Rhodes.
WINTER PARK. Jones, Sauté.

GEORGIA

ATHENS.
Univ. of Georgia. Barrow, Beckwith, Callaway, Cumming, Hill, Stephens.
ATLANTA.
Georgia School of Tech. Bailey, Field, Fulmer, Hefner, Hook, Neisius, Sewell, Smith, Starrett.
COLLEGEBORO. Moye.
DAHLONEGA. Barnes.
DECATUR. Gaylord, Robinson.
EMORY UNIVERSITY. Messick.
FORT VALLEY. Pitts.
MACON. Bruce.
MARIETTA. Howe.
MILLEDGEVILLE. Nelson.
OXFORD. Moore.
ROME. Hightower, Thompson.

IDAHO

BOISE. McFarland.
CALDWELL. Palmer, Rankin.
MOSCOW. Schwartz.

ILLINOIS

AURORA. Furman.
BLOOMINGTON. Hunt.
BLUFFS. Carter.
CARBONDALE. Mayor, Wright.
CARTHAGE. Boatman.
CHARLESTON. Hendrix, Taylor.
CHICAGO. Bay, Boardman, Brady, Campbell, Christman, Corliss, D'Arco, Davis, Esposito, Ettinger, Gore, Holland, Kurzin, Loch, Mansfield, Mary Esther, Miller, Moran, Nicolet, Schweitzer.
Illinois Inst. of Tech. Alberti, Bibb, Browne, Busemann, Caton, DeCicco, Ford, Heins, Higgins, Kliphardt, Krathwohl, Miser, Oldenburger, Opatowski, Perlin, Peterhans, Reingold, Rosenberg, Sadowsky, Scibiorski, Silber, Wiegand, Wilcox, Wilson.
Loyola Univ. Gerst, Mahoney, Templin.
Univ. of Chicago. Albert, Barnard, Bartky, Bliss, Dickson, Everett, Finch, Graves, Groves, Hartung, Hestenes, Householder, Kinney, Lane, Leavens, Logsdon, Lunn, Meyer, Northrop, Reid, Sanger, Smith, G. J. Young, J. W. A. Young.
Wilson Junior Coll. Feltges, Lange, Rasmusen.
Wright Junior Coll. Ballard, Georges, Reklis.
DECATUR. Coulter, Kiefer, Ploenges.
DE KALB.
Northern Illinois State Teachers Coll. Hellmich, Stelford, Storm.
DIXON. West.
EAST ST. LOUIS. Koken.
EUREKA. Newson.
EVANSTON.
Northwestern Univ. Broyde, Buell, Curtiss, Givens, Hellinger, Hildebrandt, Holgate, Moulton, Simmons, Wall, Wescott, Wolfe.
FREEPORT. Baumgartner.
GALESBURG.
Knox Coll. Heren, Smyth, Stephens.
GLENVIEW. Olson.
JACKSONVILLE. Hallerberg, Miller, Novak.

LAKE FOREST. Curtis.
LEBANON. Stowell.
LINCOLN. Balof.
MACOMB.
Western Illinois State Teachers Coll. Ayre, Ginnings, Schreiber.
MARION. Arena.
MONMOUTH. Beveridge.
NORMAL.
Illinois State Normal Univ. Atkin, Flagg, Mills, Poppen.
PEORIA.
Bradley Poly. Inst. Comstock, Gault, Moore.
PLAINFIELD. Paydon.
RIVER FOREST. Dobbin.
ROCKFORD. Johnson.
ROCK ISLAND. Cederberg, Olmsted.
SANDWICH. Rumney.
SPRINGFIELD. Harman, Russell.
TAYLORVILLE. Dappert.
URBANA.
Univ. of Illinois. Armstrong, Bailey, Carmichael, Coble, Crathorne, Hamming, Hartley, Hattan, Hazlett, Ketchum, Levy, Miles, Miller, Moore, Pepper, Peters, Vaughan.
WHEATON.
Wheaton Coll. Boyce, Brandt, Taylor.
WINNETKA. Humphrey.

INDIANA

ANDERSON. Wiley.
BLOOMINGTON.
Indiana Univ. Artin, Hennel, Rothrock, Wells, Weyl, Williams, Wolfe.
COLLEGEVILLE. Zanolar.
CRAWFORDSVILLE. Carscallen, Polley.
EARLHAM. Long.
EAST CHICAGO. Burns.
FORT WAYNE. Smith.
GARY. Copp, Oursler.
GOSHEN. Hartzler.
GREENCASTLE.
DePauw Univ. Arnold, Edington, Greenleaf.
HANOVER. Meyer.
HOLY CROSS. Edward.
INDIANAPOLIS. Beal, Dotterer, Getchell, McColgin, Welchons, Zieroff.
LAFAYETTE.
Purdue Univ. Ayres, Black, Bolks, Burr, Crain, Fine, Golomb, Graves, Hadley, Hardman, Hazard, Hodge, Hughes, Keller, Klinger, Lanczos, Little, Miller, Niven, Reade, Robbins, Stone, Webster.
MARION. Porter.
MUNCIE. Edwards, Shively.
NOTRE DAME.
Univ. of Notre Dame. Caparó, Landin, Menger, Pepper, Utz.
REYNOLDS. Erwin.
TERRE HAUTE. Martin, Shriner, Sousley, Straw.
UPLAND. Draper.
WEST BADEN SPRINGS. Muehlmann.

IOWA

AMES. M. M. McKelvey.
Iowa State Coll. Anderson, Bancroft, Beach, Brandner, Daniells, Davis, Fleming, Gouwens, Herr, Lonseth, J. V. McKelvey, Robertson, Smith, Snedecor, Thielman.
CEDAR FALLS.
Iowa State Teachers Coll. Hove, Kearney, Trimble, Van Engen.
CEDAR RAPIDS. Coffin, Swanson.
CRESTON. Newlin.
DES MOINES. Kirchen, McClelland, Neff.
DUBUQUE. Burns.
FAYETTE. Deming.
GRINNELL.
Grinnell Coll. Butchart, McClenon, Rusk.
HOPKINTON. Earhart.
INDIANOLA. Emmons.
IOWA CITY. Price.
State Univ. of Iowa. Chittenden, Conkwright, Craig, Knowler, Oberg, Ward, Woods, Wylie.
IOWA FALLS. Kreider.
MOUNT VERNON.
Cornell Coll. Davis, Freese, McGaw, Moots.
SIOUX CITY. Rochford.
WAVERLY. Chellevold.

KANSAS

ATCHISON. Obrist, Pretz, Sullivan.
BALDWIN. Garrett.
EL DORADO. Wrestler.
EMPORIA. Peterson, Tucker.
HAYS. Colyer, Grabbe, McCormick.
HESSTON. Driver.
KANSAS CITY. Thornton.
LAWRENCE.
Univ. of Kansas. Babcock, Black, Dougherty, Jordan, Kalisch, Marm, Price, Smith, Stouffer, Ulmer, Wheeler.
MANHATTAN.
Kansas State Coll. Babcock, Daugherty, Hyde, Janes, Lewis, Mossman, Remick, Sigley, Stratton, White.
NORTH NEWTON. Richert.
OTTAWA. Bemmels.
PITTSBURG.
Kansas State Teachers Coll. Curfman, Shirk, Smith.
SALINA. Arnoldy.
STERLING. Bell.
TOPEKA. Eberhart.
WICHITA. Greer, Longenecker, Reagan.
Univ. of Wichita. Hanna, Hoare, Read, Wedel.
XAVIER. Ann Elizabeth.

KENTUCKY

BEREA.
Berea Coll. Hutcherson, Pugsley, Roberts.
BOWLING GREEN. Yarbrough.
COVINGTON. Thuener.
GEORGETOWN. Hatfield.
LEXINGTON. Wright.
Univ. of Kentucky. Boyd, Brown, Cohen,

Downing, John, Latimer, LeStourgeon, Pence, South.

LOUISVILLE. Bloom, Bullitt, Fields, Ford, Morrison, Schaeffer.

Univ. of Louisville. Moore, Simester, Stevenson.

MAPLE MOUNT. Sheeran.

MOREHEAD. Fair.

MURRAY. Carman.

RICHMOND. Jenkins, Park.

LOUISIANA

BATON ROUGE.

Louisiana State Univ. Dorroh, Freas, Karnes, Nichols, O'Quinn, Parker, Rickey, Rutt, Sanders, Smith, Thorne, White.

HAMMOND. Tucker.

LAFAYETTE.

Southwestern Louisiana Inst. Buchanan, Loflin, Rees.

LAKE CHARLES. Bradford.

MONROE. Currie.

NATCHITOCHES.

Louisiana State Normal Coll. Blair, Killen, Maddox.

NEW ORLEANS. Dickinson, Frankenbush, Monasterio, Stevens.

Tulane Univ. Beard, Buchanan, Cramer, Duren, Humphreys, Many, Riess, Spencer, Thomson, Weiss.

PINEVILLE. Temple.

RUSTON.

Louisiana Poly. Inst. Garrison, Kaltenborn, Schroeder, Smith.

SHREVEPORT. Banks, Cooper, Hardin.

MAINE

BRUNSWICK.

Bowdoin Coll. Christie, Hammond, Holmes, Korgan, Moody.

HOULTON. Morse.

LEWISTON. Ramsdell, Wilkins.

ORONO. Bryan, Kimball.

WATERVILLE. Ashcraft.

MARYLAND

ABERDEEN PROVING GROUND. Dederick, Green, Hart, Mills.

ANNAPOLIS. Bingley, Buchanan, Wilson.

U. S. Naval Acad. Ayres, Ball, Bleick, Bramble, Church, Clements, Currier, Dillingham, Gere, Kells, Lamb, Lyle, Moore, Phelps, Rawlins, Root, Scarborough, Sears.

BALTIMORE. Karl, Roman, Smith.

Goucher Coll. Bacon, Lewis, Torrey.

Johns Hopkins Univ. Bourne, Cohen, Morrill, Murnaghan, Reed, Zariski.

COLLEGE PARK.

Univ. of Maryland. Hall, Lancaster, Richeson.

EMMITSBURG. Burke.

FREDERICK. Brown.

FROSTBURG. Hallett.

TOWSON. Littauer.

MASSACHUSETTS

AMHERST. Esty, Kleene.

Massachusetts State Coll. Boutelle, Miller, Moore.

BELMONT. Jackson.

BOSTON. Brown, Bruce, Combellack, Gould, Hemenway, Hubbard, Laurentine, Miller, Mode, Spear, Weaver, Wilson.

BROOKLINE. McCarthy.

CAMBRIDGE.

Harvard Univ. Beatley, G. D. Birkhoff, G. Birkhoff, Boas, Buck, Coolidge, Emmons, Huntington, Kaplansky, Mac Lane, Rulon, Stone, Walsh, Widder.

Massachusetts Inst. of Tech. Cameron, Clifford, Douglass, Franklin, Harvey, Haskins, Moon, Salem, Woods, Zeldin.

CHESTNUT HILL. Marcou, O'Donnell.

CHICOPEE. Madden.

EAST BOSTON. Lennahan.

GROTON. Holt, Nash.

LYNN. Oergel, Taylor.

MILFORD. Dennison.

MOUNT HERMON. Lockwood.

NORTHAMPTON. Munroe.

Smith Coll. McCoy, Montgomery, Newton, Rambo.

NORTON. Garabedian, Watt.

PETERSHAM. Moriarty.

PITTSFIELD. Washburne.

SOUTHBOROUGH. Harrison.

SOUTHBRIDGE. Boeder.

SOUTH HADLEY. Litzinger.

SWAMPSCOTT. Evans.

TUFTS COLLEGE. Mergendahl, Ransom.

TYNGSBORO. Richmond.

WELLESLEY.

Wellesley Coll. Copeland, Merrill, Russell, Stark, Young.

WESTON. Burke.

WILLIAMSTOWN.

Williams Coll. Agard, Beer, Gillette, Wells.

WORCESTER. Melville, Wheeler.

Worcester Poly. Inst. Brown, Gay, Morley, Rice.

MICHIGAN

ALBION. Ingalls, Sleight.

ANN ARBOR.

Univ. of Michigan. Bradshaw, Cebula, Churchill, Coe, Copeland, Craig, Crispin, Dwyer, Faulkner, Field, Fischer, Goldstine, Hay, Hildebrandt, Hopkins, Johnson, Kaplan, Karpinski, Love, Nyswander, Rainich, Rainville, Rouse, Rufus, Running, Schorling, Thrall, Wilder.

DEARBORN. Jones.

DETROIT. Bagby, Denton, Goldman, Mary Paula, Sanders, Shires.

Univ. of Detroit. Hausmann, Johnston, McCarthy.

Wayne Univ. Baldwin, Borgman, Folley, Morrow, Nelson, Pixley.

EAST LANSING.

Michigan State Coll. Barbour, Baten, Bis-

singer, Frame, Grove, Hill, Nordhaus, Plant, Powell, Speeker, Toralballa, Van Schaack, Welmers.
FLINT. DeMoss, Swanson.
GRAND RAPIDS. Bellardo, Warren.
HART. Burdick.
HIGHLAND PARK. Peterson.
HILLSDALE. Beeler.
HOLLAND. Lampen.
IRONWOOD. Field.
KALAMAZOO. Walton.
Western Michigan Coll. Ackley, Bartoo, Blair, Butler, Cain, Everett.
KALKASKA. Dunlap.
MARQUETTE. Spooner.
MIDLAND. Spencer.
MILFORD. McNeal.
MOUNT PLEASANT. Foust, Richtmeyer.
MUSKEGON. Conger.
YPSILANTI. Erikson, Lindquist.

MINNESOTA

COLERAINE. Davis.
COLLEGEVILLE. Danzl, Winkelmann.
DULUTH. Cothran, Mercedes, Strane.
ELY. Cramer.
GILBERT. Schey.
HIBBING. Erickson.
MINNEAPOLIS. Shuman.
Univ. of Minnesota. Amundson, Brink, Brooke, Bussey, Campaigne, Carlson, Colson, Eggers, Fattu, Fischer, Gibbens, Hart, Hartig, Jackson, Jensen, Johnston, Kirchner, Koehler, McCutcheon, McEwen, Munro, Ness, Olmsted, Priester, Quaid, Saunders, Scammon, Shumway, Stigler, Thorp, Turner, Turrittin, Underhill.
MOORHEAD. Andersen, Mundhjeld.
NORTHFIELD. Carlson.
Carleton Coll. Gingrich, Milleson, Wegner.
ROCHESTER. Hickman.
ST. JOSEPH. Scoblic.
ST. PAUL. Camp, Thornton.
Coll. of St. Thomas. Bush, Spitzbart, Taylor.
ST. PETER. Nelson.
VIRGINIA. Hancock.
WINONA. De La Salle.

MISSISSIPPI

BILOXI. Gerst.
CLEVELAND. Ward.
CLINTON. Barnes.
JACKSON. Babbitt, McCoy, Mitchell, Van Hook.
STATE COLLEGE.
Mississippi State Coll. Coker, Murray, Ollivier, Pettis, Smith
UNIVERSITY.
Univ. of Mississippi. Bickerstaff, Hume, Quarles.

MISSOURI

CAPE GIRARDEAU. Michel.
CLAYTON. Lafferty.
COLUMBIA. Cosby, Callaway.
Univ. of Missouri. Blumenthal, Ewing, Ferguson, Haynes, Shanks, Wahlin, Wehausen, Westfall.
FAYETTE. Hadley.
FULTON. Sweazey.
HANNIBAL. Foreman.
JEFFERSON CITY. Jason, Talbot.
KANSAS CITY. Cutting, Doyle, Pierson.
KIRKSVILLE. Jamison.
MARYVILLE. Lane.
PARKVILLE. Crull, Messick.
ROLLA. Erkiletian.
ST. CHARLES. Karr.
ST. LOUIS. Bock, Callaghan, Case, Gatewood, Marth, Shreve, Siroky.
Washington Univ. Dunkel, Middlemiss, Rider, Roever.
SPRINGFIELD. Finkel, Graves, H'Doubler.
WARRENSBURG. Jacobson.
WEBSTER GROVES. Clarke.

MONTANA

BOZEMAN. Hurst.
BUTTE. Smith.
GARRISON. Canning.
HELENA. Topel.
MISSOULA. Carey, Merrill.

NEBRASKA

CHADRON. Berry.
GILEAD. Erwin.
HASTINGS. Hadlock, McDill.
LINCOLN. Arnold, Gass, Howie, Ogden.
Univ. of Nebraska. Basoco, Brenke, Camp, Candy, Congdon, Cox, Gaba, Harper, Huff, Hull, Linscheid, Runge.
OMAHA. Bettinger, Dwyer.
Univ. of Omaha. Coleman, Earl, Rice.
WAYNE. Boyce.
YORK. Feemster.

NEVADA

RENO. Beesley, Wood.

NEW HAMPSHIRE

CONCORD. Conwell.
DURHAM. Lewis, Slobin.
EXETER. Adkins, Funkhouser, Pennell.
HANOVER. Morgan.
Dartmouth Coll. Brown, Forsyth, Mathewson, Nordstrom, Perkins, Robinson, Silverman, Street, Wilder.
KEENE. Goodrich.
MANCHESTER. O'Leary.
PLYMOUTH. Smith.

NEW JERSEY

CLIFTON. Struyk.
CONVENT STATION. Kenna.
DOVER. Cohen.
EAST ORANGE. Nordgaard.
HIGHTSTOWN. Litterick.
HOBOKEN. Hazeltine, Murray, Schnefel.
JERSEY CITY. Kopp, McGrath.
LAKEWOOD. Wallick.

LAWRENCEVILLE.
Lawrenceville School. Durell, Kimball, Mikesh.
MADISON. Battin.
NEWARK. Karst, MacDonald, Mosesson, Strock.
NEW BRUNSWICK.
Rutgers Univ. Bunyan, Galbraith, Grant, Meder, Morris, Nelson, Starke, Walter.
NORTH PLAINFIELD. Rayher.
PATTERSON. McGlade.
PRINCETON. Flood.
Inst. for Advanced Study. Alexander, Morse, Veblen, von Neumann.
Princeton Univ. Adams, Bohnenblust, Brock, Eisenhart, Gillespie, Lefschetz, Mosteller, Rauch, Scheffé, Tompkins, Tucker, Tukey, Wedderburn, Wilks.
SOUTH ORANGE. Rauch, Stanwick.
TEANECK. Coleman.
TRENTON. Shuster.
UPPER MONTCLAIR.
New Jersey State Teachers Coll. Campbell, Clifford, Davis, Fehr, Mallory.
WEST ORANGE. Edison.

NEW MEXICO

ALBUQUERQUE. Bauer.
Univ. of New Mexico. Barker, Gentry, Larsen, Newsom, Rosenthal, Valuckas.
LAS VEGAS. Roberts, Rodgers.
PORTALES.
Eastern New Mexico Coll. Fleck, Rosen, Wallis.
ROSWELL. Harp.
SOCORRO. Reece.
STATE COLLEGE.
New Mexico Coll. of A. and M.A. Branson, Heinzman, Swingle, Wells.

NEW YORK

ALBANY.
New York State Coll. for Teachers. Beaver, Birchenough, DoBell, Lester, Snader, Stokes.
ALFRED.
Alfred Univ. Lowenstein, Nevins, Polan, Seidlin, Titsworth, Whitford.
AURORA.
Wells Coll. Clement, Hollcroft, Rusk.
BROOKLYN. Braverman, Charosh, Cowles, Eichert, First, Kalish, Koch, Kramer-Lassar, Lavoie, Levy, Lieber, Mandel, McCarthy, McMahon, Mehr, Miller, Palladino, Peters, Rush, Salkind, Thompson, Tolle, Treiber, Wallach.
Brooklyn Coll. Borofsky, Boyer, Douglas, Fleisher, Forman, Griffin, Harkin, Hurwitz, Johnson, Kennison, Landers, MacNeish, Maria, Moore, Prenowitz, Richardson, Singer, Smith, Wolfe, Woodbridge.
Poly. Inst. of Brooklyn. Berry, Foster, Reagan, Whitford.
BUFFALO. Bartram, Blanche, Browne, Harrington, Podmele.
Univ. of Buffalo. Brendel, Civin, Gehman, Montague, Ott, Pound.
CLINTON.
Hamilton Coll. Brown, Ferry, Johanson, McBrien, Patterson.
ELMIRA. Suffa.
FLUSHING.
Queens Coll. Archibald, Brown, Cairns, Cope, Feld, Raudenbush, Sard, Williamson.
GARDEN CITY. Bowden, Schultz.
GENEVA. Durfee, Hubbs.
HAMILTON.
Colgate Univ. Rude, Munshower, Wardwell.
HAYT CORNERS. Ford.
HEMPSTEAD. Ollmann, Stabler.
HOUGHTON. Davison.
ITHACA.
Cornell Univ. Agnew, Beinert, Carver, Curtiss, Firestone, Flexner, Gunderson, Hailperin, Hatfield, Hurwitz, Jones, Kac, Lee, Manning, Moses, Peiser, Rosser, Scott, Smith, Snyder, Walker.
KENMORE. Hodges.
LOUDONVILLE. Nickol.
NEW YORK. Berger, Bergstresser, Berkeley, Bernard, Boehm, Buell, Buikstra, Burgess, Crane, Darraugh, D'Atri, A. M. Ginsburg, J. Ginsburg, Gray, Hastings, Heath, Hlavaty, Jablonower, Joffe, Karapetoff, Katz, Keeler, Kirby, Kraitchik, Kubis, Lazar, Lehner, Longfellow, Martin, McKenna, Mirick, Molina, Moore, Nehrbas, Oehler, Phillips, Quilty, Roll, Ruderman, Schwartz, Sheridan, Skelding, Steinhaus, Stuckey, Swenson, Wayne, Weaver, Young.
Bell Telephone Labs. Jones, MacColl, Mead, Fry, Gray, Harvey, Riordan, Schelkunoff, Shewhart.
Coll. of the City of New York. Allen, Fagerstrom, Gill, Griffin, Grove, Hubert, Linehan, MacEwen, Milkman, Post, Robinson, Turner, Whitford, Wirth, Wright.
Columbia Univ. Comer, Fite, Gentzler, Hutchinson, Kasner, Ladue, Mullins, Piranian, Reeve, Ritt, Siceloff, Smith, Upton, Walker.
Cooper Union. Lehmann, Miller, Roth, Tanzola.
Hunter Coll. Anderson, Aroian, Bowden, Bradley, Mrs. J. H. Bushey, J. H. Bushey, Cooper, Darkow, Eisele, Hill, Kutman, Landers, Rees, Simons, Weisner, Whelan.
New York Univ. Adler, Bernstein, Cooley, Courant, Doermann, Flanders, Forray, Graham, John, Kline, Norman, Payne, Peters, Putnam, Reddick, Rehberg, Schlauch, Tilley, Wahlert, Yanosik.
NIAGARA UNIVERSITY. O'Connor.
ONEONTA. Callahan, Sanford.
PELHAM. Milos.
POTSDAM. Buxton, Waltz.

POUGHKEEPSIE.
Vassar Coll. Baker, Durand, Wells.
ROCHESTER. Chesna, Eastham, Fraser, Harding.
Univ. of Rochester. Atkins, Bernstein, Betz, Gale, Long, Seidel, Watkeys.
ST. BONAVENTURE. Scheier.
SCHENECTADY. Poritsky.
Union Coll. Burkett, Fox, Morse, Rhodes, Snyder.
STATEN ISLAND. Baez, Karnow.
SYRACUSE.
Syracuse Univ. Carroll, Celauro, Decker, Eves, Halmos, Harwood, Martin, S. H. Taylor, W. E. Taylor.
TROY.
Rensselaer Poly. Inst. Allen, Biggerstaff, Brown, Campbell, Merrill, Nash, Stilwell.
WEST POINT.
U. S. Military Acad. Farnell, Hazlewood, Jones, Yates.
WYOMING. Hartnell.

NORTH CAROLINA

BUIE'S CREEK. Harris.
CHAPEL HILL. Carroll.
University of North Carolina. Browne, Cameron, Garner, Henderson, Hickerson, Hill, Lasley, Mackie, Reynolds.
CHARLOTTE. Douglass, Jones, Woodson.
DAVIDSON. McGavock, Mebane.
DURHAM.
Duke Univ. Dressel, Elliott, Gergen, Hickson, Patterson, Rankin, Roberts, Thomas.
GREENSBORO. Barton, Pegram, Strong.
GREENVILLE. Graham, ReBarker.
HIGH POINT. Adams.
MARS HILL. Howell, Robinson.
RALEIGH. Downing, Eason.
North Carolina State Coll. Bullock, Cell, Levine, Strobel.
RED SPRINGS. Prince.
SALISBURY. Dearborn.
WILMINGTON. Peebles.

NORTH DAKOTA

FARGO. Smith
GRAND FORKS. Mason, Staley.
JAMESTOWN. Jackson.

OHIO

ADA. Whitted.
AKRON. Bender, Selby.
ALLIANCE. Ruddick.
ATHENS.
Ohio Univ. Denbow, Marquis, Miller, Reed, Starcher.
BEREA.
Baldwin-Wallace Coll. Annear, Brown, Stright.
BOWLING GREEN. Mathias, Overman.
CHILLICOTHE. Mathias.
CINCINNATI. Reilly.
Univ. of Cincinnati. Barnett, Brand, Hancock, Justice, Lipsich, Lubin, Merriman, Moore, Smith, Szász, Taylor, Yowell.
CLEVELAND. Anderson, Bailey, Burwell, Garvin, Johnson.
Case School of Appl. Sci. Brown, Burington, Focke, Green, Justin, Morris, Nassau, Pierce, Rinehart, Thomas, Torrance.
Fenn Coll. Godfrey, Kelly, Patterson, Tolar, Van Voorhis.
John Carroll Univ. Dustheimer, Hunter, Joliat.
Western Reserve Univ. Boyce, Musselman, Simon.
CLEVELAND HEIGHTS. Irr.
COLUMBUS. Singer, Wildermuth.
Ohio State Univ. Albert, Bamforth, Bareis, Beatty, Blumberg, Caris, Jones, Kuhn, LaPaz, Manson, Maple, Mickle, Morris, Parrish, Radó, Rasor, Rice, Rickard, Synge, Toops, Woods, Wylie.
DAYTON. Eagle, Johnson, Schraut.
DEFIANCE. MacCullough.
DELAWARE. Crane, Rowland.
GAMBIER. Bumer, MacNeille.
GRANVILLE.
Denison Univ. Bright, Heyda, Ladner, Moeller, Stewart, Wiley.
HIRAM. Clarke.
KENT.
Kent State Univ. Brooks, Harshbarger, Manchester, Olson, Rogers, Stelson.
LAKESIDE. Wolfe.
LAURELVILLE. Reichelderfer.
MARIETTA. Bennett, Sandt.
MOUNT ST. JOSEPH. Corona.
NAPOLEON. Yeager.
NEW CONCORD. Knight.
NEW LEXINGTON. Hoops.
NORTH BALTIMORE. Blackall.
OBERLIN. Smyth.
Oberlin Coll. Cairns, Carr, Randolph, Sinclair, Vance, Wagner, C. H. Yeaton, M. M. Yeaton.
OXFORD. Goins, Tappan.
Miami Univ. Anderson, Pollard, Spenceley, Wolfe.
PAINESVILLE. Peters.
SPRINGFIELD. Krueger, Tripp.
TOLEDO. Koley, Mercedes.
Univ. of Toledo. Brandeberry, Dancer, Lemme, Welker.
WESTERVILLE. Glover.
WILBERFORCE. Toney.
WILMINGTON. Spinks.
WOOSTER.
Coll. of Wooster. Fobes, Hildner, Knight, Williamson, Yanney.
YELLOW SPRINGS. Astrachan, Helms.
YOUNGSTOWN. Foard, McKissock.

OKLAHOMA

ADA. Heimann.
ALVA. Hall.
NORMAN.
Univ. of Oklahoma. Brixey, Court, Duval, Hassler, LaFon, McFarland, Reaves, Springer.

SHAWNEE. Doerfler, Short.
STILLWATER.
Oklahoma A. and M. Coll. Allen, Barnett, Flanders, Smith, Zant.
TULSA. Ellis, Veatch.

OREGON

CORVALLIS.
Oregon State Coll. Beaty, Hammer, LaRoe, Milne, Sobczyk, Williams.
EUGENE.
Univ. of Oregon. DeCou, Maddaus, Moursund, Peterson, Poole, Scobert, Wood.
FOREST GROVE. Price.
MCMINNVILLE. Ramsey.
PORTLAND. Griffin, Hadley, Merriss.
SALEM. Luther.

PENNSYLVANIA

ALLENTOWN. Billig, Deck, Koehler, Kunkel.
ANNVILLE. Black.
BEAVER FALLS. Cleland.
BETHLEHEM. Ashbaugh, Rader.
Lehigh Univ. Cutler, Fort, Latshaw, Pitcher, Raynor, Reynolds, Shook, Smail, Smiley, Van Arnam.
BRISTOL. Downing.
BRYN MAWR. Allen, Atkinson, Williams.
Bryn Mawr Coll. Lehr, Oxtoby, Wheeler.
CAMBRIDGE SPRINGS. Hawthorne.
CARLISLE. Ayres, Stuart.
CHESTER. Campbell, Williams.
COLLEGEVILLE.
Ursinus Coll. Clawson, Dennis, Manning.
DREXEL HILL. Maddrill.
EASTON.
Lafayette Coll. Benner, Cawley, Hatch, C. V. L. Smith, W. M. Smith.
ELIZABETHTOWN. Heilman.
ERIE. Benedicta, Kraus, Sullivan.
GETTYSBURG. Clutz.
GREENSBURG. McNeil.
GROVE CITY. Carpenter, Renwick.
HARRISBURG. Whited.
HAVERFORD.
Haverford Coll. Allendoerfer, Oakley, Vedova, Wilson.
HAZELTON. Herpel.
HERSHEY. Haag.
HUNTINGDON. Stayer.
KUTZTOWN. Knedler.
LANCASTER.
Franklin and Marshall Coll. Ikenberry, Marburger, Murray.
LATROBE. Seubert.
LEWISBURG.
Bucknell Univ. Gold, MacCreadie, Miller, Richardson.
LOCK HAVEN. Smith.
MEADVILLE. Smith, Steen.
MERCERSBURG. Johnson.
MILLERSVILLE. Boyer.
NEW KENSINGTON. Sturm.
NEW WILMINGTON. Black.
OAKMONT. Petrie.
OXFORD. Haviland.
PHILADELPHIA. Brown, Cavalli, Cherry, Constable, Davis, Eggert, Epstein, Fudge, Latshaw, Leifer, McDonough, McNeary, Robertson, Russ, Slepin, Smith.
Univ. of Pennsylvania. Caris, Evans, Kline, Luginbuhl, Pflaum, Safford, Shohat, Wallace, Whitman, Wilson.
PICTURE ROCKS. Price.
PITTSBURGH. Arnold, Baird, Briant, Buker, Calkins, Donaldson, Frankel, Jamison, Mullan, Wells.
Carnegie Inst. of Tech. Dines, Hoover, Johnson, Levine, Moskovitz, Neelley, Olds, Rosenbach, Saibel, Smith, Starr, Whitman.
Univ. of Pittsburgh. Blumberg, Bryson, Foraker, Hovey, Wagner.
PLEASANTVILLE. Kerr.
POTTSVILLE. Knapper.
READING. Speicher.
SCRANTON. Bertrand, Mary Daniel.
SHENANDOAH. Bauser.
SHIPPENSBURG. Kieffer.
SLIPPERY ROCK. Lady.
STATE COLLEGE. H. B. Owens.
Pennsylvania State Coll. Cohen, Cunningham, Curry, Dunlap, Frink, Gordon, Gravatt, Graves, Hagen, Harrington, Johnson, F. W. Owens, Rogers, Rupp, Schwartz, Sheffer.
SWARTHMORE.
Swarthmore Coll. Brinkmann, Dresden, Marriott.
VILLANOVA. Crawford.
WASHINGTON.
Washington and Jefferson Coll. Bert, Dorwart, Shaub, Thomas.
WAYNESBURG. Moston.
YORK. Baker.

RHODE ISLAND

KINGSTON. Brown, Stauffer.
NEWPORT. Chase.
PROVIDENCE. McKenney.
Brown Univ. Adams, Archibald, Bennett, Carlen, Gaskell, Gilman, Manning, Richardson, Saltzer, Schmidt, Smiley, Tamarkin.

SOUTH CAROLINA

CHARLESTON.
The Citadel. Dye, Hair, Hutchison, Reves, Saunders.
CLEMSON. Stanley.
CLINTON. Spencer.
COLUMBIA.
Univ. of South Carolina. Dinkines, Jackson, Shuler, Williams.
GREENVILLE. Blackwell.
HARTSVILLE. Reaves.
NEWBERRY. Gaver.
ROCK HILL. Stokes.
SPARTANBURG. Pettis.

SOUTH DAKOTA

BROOKINGS.
South Dakota State Coll. MacDougal, Walder, Wente.

MITCHELL. Knox.
RAPID CITY. Swanson.
SIOUX FALLS. Winn.
SPEARFISH. Hesseltine.
SPRINGFIELD. Hoopes.
VERMILLION.
Univ. of South Dakota. Ekman, Howell, Sealander.

TENNESSEE

CHATTANOOGA. Hughes, Massey, Mays.
GOOKEVILLE. Hutchinson, Moorman.
FOUNTAIN CITY. Keller.
HARROGATE. Bowling.
JEFFERSON CITY. Sloan.
JOHNSON CITY. Carson.
KNOXVILLE.
Univ. of Tennessee. Cooley, Eaves, Ficken, Gillis, Lee, Pepper, Pollard, Purviance.
MARYVILLE. Sisk.
MEMPHIS. Locke, Walbert.
NASHVILLE. Falvey, Jordan, N. P. Miser, Van Horn, Wren.
Vanderbilt Univ. Blair, Hyden, Lundberg, W. L. Miser, Morrel.

TEXAS

ABILENE. Burnam, Mullings, Tate.
ALPINE. Gilley.
AMARILLO. Layton, Whetstone.
ARLINGTON. Howard.
AUSTIN.
Univ. of Texas. Anderson, Batchelder, Beckenbach, Craig, Decherd, Ettlinger, Greenwood, Lubben, Moore, Nelson, Vandiver.
BONHAM. McLaughlin.
BROWNSVILLE. de la Garza.
CANYON. Murray.
COLLEGE STATION.
A. and M. Coll. of Texas. Basye, Blumberg, Daum, Edmonson, Klipple, Luther, McCulley, Moore, Pinkerton, Wapple.
DALLAS. Sorrells.
Southern Methodist Univ. Huff, Mouzon, Starr.
DENTON. White.
North Texas State Teachers Coll. Brown, Cooke, Hanson.
EL PASO. Schwid.
FORT WORTH. Ramsey, Sherer.
GEORGETOWN. Olson.
HOUSTON. Baker, Blau, Horn, Rees, Slotnick, Underwood.
Rice Inst. Bray, Brunk, Dean, Lovett, Mandelbrojt, Ulrich.
HUNTSVILLE. Querry.
KINGSVILLE. Kennedy.
LUBBOCK.
Texas Tech. Coll. Heineman, May, Michie, Parker, Rowland, Sparks, Thompson, Underwood, Webb.
MAYPEARL. Thomas.
PRAIRIE VIEW. Randall, Stephens.
SAN ANTONIO. Mary of Mercy, McNelly, Morgan, Newton, Schnepp.
STEPHENVILLE. McSweeny, Redden.
TEAGUE. Notley.
WICHITA FALLS. Adams.

UTAH

LOGAN. Bird, Calvert.
ST. GEORGE. Everett.
SALT LAKE CITY. Bridger.
Univ. of Utah. Biesele, Gibson, Hayes, Henriques, Horsfall, Pehrson.

VERMONT

BURLINGTON.
Univ. of Vermont. Bullard, Butterfield, Millington, Swift.
MIDDLEBURY.
Middlebury Coll. Ballou, Bowker, Hazeltine, Perkins.
NORTHFIELD. Dix.
RANDOLPH. Alliot.
SAXTONS RIVER. Belding.

VIRGINIA

ASHLAND. Blincoe, Simpson.
BLACKSBURG.
Virginia Poly. Inst. Hatcher, McFadden, O'Shaughnessy.
BUENA VISTA. Durham.
CHARLOTTESVILLE. Patten.
Univ. of Virginia. Aylor, Hedlund, Linfield, McShane, Oglesby, Whyburn.
EMORY. Miller.
ETTRICK. Hunter.
FARMVILLE. Taliaferro.
FREDERICKSBURG. Frick.
HAMPTON. Perkins.
HOLLINS. Allen.
LEXINGTON. Paxton, Smith.
Virginia Military Inst. Byrne, Knox, Purdie.
LYNCHBURG. Baker, Elder, Larew, Wiggin.
MIDDLEBURG. Keppler.
NEWPORT NEWS. Raine.
NORFOLK. Smith.
RICHMOND. Drew.
Univ. of Richmond. Coleman, Gaines, Harris, Wheeler.
SALEM. Carpenter.
STAUNTON. Taylor.
SWEET BRIAR.
Sweet Briar Coll. Bates, Cole, Morenus.
WILLIAMSBURG.
Coll. of William and Mary. Calkins, Gregory, Phalen, Stetson.

WASHINGTON

ABERDEEN. Porter.
CENTRALIA. Van Arkel.
CHENEY. Bell.
PULLMAN.
State Coll. of Washington. Butler, Hacker, Knebelman, Ogawa.
SEATTLE. Beegle, Muggli.
Univ. of Washington. Ballantine, Cramlet, Haller, Jerbert, McFarlan, Mullemeister, Winger, Zuckerman.
SPOKANE. Carlson.
TACOMA. Martin.

WALLA WALLA. Bratton, Stewart.
YAKIMA. Whitney.

WEST VIRGINIA

KEYSER. Krabill.
LEWISBURG. Davis.
MONTGOMERY. Reckzeh.
MORGANTOWN.
West Virginia Univ. Davis, Eiesland, Peters, Reynolds, Turner, Vehse, Vest.
WEST LIBERTY. Kiplinger.

WISCONSIN

APPLETON. Berry.
BELOIT. Conwell, Huffer.
CUDAHY. Sedlak.
EAU CLAIRE. Ullsvik.
LA CROSSE. Adkins.
MADISON. Felder.
Univ. of Wisconsin. Allen, Butter, Evans, Hart, Ingraham, Kenney, Langer, MacDuffee, March, Simpson, Sokolnikoff, Trump.
MILWAUKEE. Beckwith, Bigelow, Boehmer, London, Mary Felice, Norris.
Marquette Univ. Luteyn, Pettit, Wilczewski.
Univ. of Wisconsin Exten. Div. Bardell, Battig, Marden, Parkinson, Vass, Wolf.
OSHKOSH. Beenken, Price.
PLATTEVILLE. Harrell.
RIVER FALLS. Eide.
ST. FRANCIS. Fetterer, Jautz, Mary Gertrude.
SUPERIOR. Flogstad, Smith.
WAUKESHA. Dancey, Hopkins.
WEST ALLIS. Fitzpatrick.
WEST DEPERE. DeCleene.
WHITEFISH BAY. Anderson.

WYOMING

LARAMIE. Bellamy.
Univ. of Wyoming. Barr, Neubauer, Rechard, Varineau.

CANADA

EDMONTON.
Univ. of Alberta. Campbell, Cook, Sheldon.
FREDERICTON. Miller.
HAMILTON. Findlay.
KINGSTON.
Queen's Univ. Blyth, Jeffery, Miller.
LENNOXVILLE. Richardson.
LONDON. Cole, Kingston.
MONTREAL. Gauthier, Gough, Pelletier, Perry.
McGill Univ. Pall, Tate, Wood.
OTTAWA. Dubé.
QUEBEC. Pouliot, Tremblay.
REGINA. Oakland.
SACKVILLE. Crawford, McEwen.
SASKATOON. Pyke.
TORONTO. Dobson, Grant.
Univ. of Toronto. Beatty, Brauer, Burk, Coxeter, Pounder, Robinson, Rosebrugh.
VANCOUVER.
Univ. of British Columbia. Buchanan, Gage, James, Nowlan.
WELLS. Stewart.
WINNIPEG. Warren, Wilson.
WOLFVILLE. Macphail.

FOREIGN MEMBERS

ARGENTINA

BUENOS AIRES. Baidaff, Barral-Souto.

AUSTRALIA

ADELAIDE. Wilton.

BELGIUM

UCCLE. Errera.

BRITISH HONDURAS

BELIZE. Zimmerman.

CHILE

SANTIAGO. Moreno.

CHINA

CANTON. MacDonald

CUBA

HAVANA. Corral y Alemán, Gonzáles.

ECUADOR

QUITO. Thullen.

ENGLAND

CAMBRIDGE. Hardy.
CHIPPING NORTON. O'Hara.
LONDON. Dalal, Todd.

FINLAND

HELSINGFORS. Ahlfors.

HUNGARY

BUDAPEST. Arany.

INDIA

BANGALORE. Iyengar.
MADRAS. Durairajan.
POONA. Banerji.
SURAT. Shah.

IRELAND

BELFAST. McCrea.
DUBLIN. Rowe.

ITALY

BOLOGNA. Bortolotti.
NAPLES. Crudeli.
ROME. Enriques, Laboccetta.

MEXICO

MEXICO. Nápoles.

NEW ZEALAND
DUNEDIN. Martyn.

PANAMA
PANAMA CITY. Linares.

PERU
LIMA. de Losada y Puga.

PORTUGAL
LISBON. Caraça, Cunha.

ROUMANIA
TIMISOARA. Sergescu.

RUSSIA
MOSCOW. Kryloff.

SOUTH AFRICA
BLOEMFONTEIN. Arndt.

SPAIN
SAN SEBASTIAN. Thébault.

STRAITS SETTLEMENTS
SINGAPORE. Oppenheim.

SWITZERLAND
FRIBOURG. Bays.
NEUCHÂTEL. DuPasquier.

SYRIA
BEIRUT. Jurdak.

URUGUAY
MONTEVIDEO. Calcagno.

BY-LAWS OF THE MATHEMATICAL ASSOCIATION OF AMERICA (INC.)

(As amended to January 1, 1944)

Article I—Name, Purpose and Corporate Seal

1. This organization shall be known as

The Mathematical Association of America (Incorporated)

2. Its object shall be to assist in promoting the interests of mathematics in America, especially in the collegiate field, by holding meetings in any part of the United States or Canada for the presentation and discussion of mathematical papers, by the publication of mathematical papers, journals, books, monographs and reports, by conducting investigations for the purpose of improving the teaching of mathematics, by accumulating a mathematical library and by coöperating with other organizations whenever this may be desirable for attaining these or similar objects.

3. The Corporate Seal of the Association shall have inscribed thereon the name of the Association and the words "Corporate Seal—Illinois."

Article II—Membership

1. Any person who is interested in the field of collegiate mathematics shall be eligible for election to membership in the Association.

2. Any institution in which the Calculus is regularly taught shall be eligible for election to institutional membership in the Association. Such an institution shall have the privilege of sending a voting delegate to the meetings of the Association.

3. Election to membership shall be by vote of the Board upon written application from the individual or institution seeking admission, endorsed in the case of individuals by two members of the Association.

4. Those who were admitted to membership in The Mathematical Association of America (unincorporated) prior to October 1, 1920, and were in good standing as such on that date, were thereby admitted to membership in this Association (Incorporated).

Article III—Board of Governors and Officers

1. The Officers of the Association shall be a President, a First Vice-President, a Second Vice-President, an Editor-in-Chief of the Official Journal (hereinafter called the "Editor"), a Secretary-Treasurer, and an Associate Secretary.

2. There shall be a Board of Governors (hereinafter called the "Board"), to consist of the Officers, the Ex-Presidents for terms of six years after the expiration of their respective presidential terms, and of additional elected members (hereinafter called "Governors"). It shall be the function of the Board to supervise all scholarly and scientific activities of the Association, to administer and control these activities, and to authorize expenditures of funds of the Association, except that at the demand of ten or more members of the Board, or at the demand of forty or more members of the Association, any proposal to alter or initiate a matter of policy shall be referred to the general membership of the Association for its decision. All members of the Board shall hold over until their respective successors are selected or appointed and qualify.

3. There shall be an Executive Committee advisory to the Board, and consisting of the President, the two Vice-Presidents, the Editor and the Secretary-Treasurer. It shall be the function of this Committee to review continually the policies and activities of the Association, to plan and organize new activities, to formulate in broad outline the programs of meetings and of publications, and in general to consider all matters of importance or of interest to the Association. This Committee shall prepare the agenda for meetings of the Board, and shall analyze the implications and aspects of all matters which are to come before the Board for decision. It shall present to the Board the viewpoints suggested by such analyses, as well as all such facts as may seem pertinent, or as may in any way facilitate the Board's work.

4. A statement regarding any proposed action of the Board which makes or alters a question of policy shall be published in the official journal, or notice of such proposed action shall be mailed to each member, before final action has been taken, so that members of the Association may make known to the Board their individual views.

5. The Board shall have authority to fill vacancies *ad interim* in any office, including vacancies in the Board, and to make any other appointments necessary for the transaction of the business of the Association.

6. At all meetings of the Board of Governors a quorum shall consist of not less than five (5) members and no business may be validly transacted at a meeting at which less than a quorum is present; *provided* that any meeting of the Board, whether or not a quorum be pres-

ent, may be adjourned to a specified time and place by a majority of the members present without notice to the members at large other than announcement at such meeting. Informal action based on a mail ballot by the members of the Board, if ratified at a properly convened meeting of the Board, shall be as valid and effective as if originally authorized at such meeting.

7. There shall be a Finance Committee responsible to the Board; at the direction of the Board it shall receive and administer the funds of the Association, control its properties and investments, make its contracts, and exercise such powers as may be delegated to it by the Board. This committee shall consist of three members, of whom the Secretary-Treasurer shall be one.

8. (a) The Officers and Governors of the Association shall be elected in part by the Board, in part by the general membership, and in part by this membership in constituencies (hereinafter called "Regions") established by the Board.

(b) The membership at large shall elect in alternate years respectively a President and a First Vice-President, each for a term of two years, and shall elect each year two Governors, for terms of three years.

(c) The membership in each Region shall elect biennially a Governor for a term of two years. Nominations shall be made by the Section or Sections of the Association existing within the Region, or, in the absence of such Sections, by a committee appointed for that purpose by the Governor representing the Region.

(d) The Board shall elect at appropriate times by ballot and for the terms stated: a Second Vice-President for two years; an Editor, a Secretary-Treasurer, and an Associate Secretary, each for five years; and members of the Finance Committee (other than the Secretary-Treasurer) for four years.

(e) The President shall be ineligible for reëlection. The Vice-Presidents, the Editor, and the Governors shall be eligible for reëlection only after an interim equal to their respective terms of office.

(f) Elections by the Board shall be made from nominations by the Executive Committee. At least two nominations shall be made for each office to be filled in the case of the Second Vice-President and the members in the Finance Committee, and the Board may in any case reject all nominations made and call for a new list.

(g) The names of members to be printed upon the ballots, together with blank spaces in the case of elections by the general membership, shall be determined by a Nominating Committee to be appointed annually for that purpose by the Board. Approximately two months before the date of the annual meeting all members shall be given an opportunity to nominate by mail a candidate for each office to be filled by the members for the ensuing year. Approximately one month before the annual meeting the Board shall select a nominee for President out of the three persons who received the most votes for this office in the nominations; the Board shall furthermore select two candidates for each other office to be filled by the members, one being the person who received the highest vote in the nominations and the other being selected from among the several nominees next in order. The election shall be by mail or in person and shall close on the day of the annual meeting.

9. The President shall be the Executive Officer of the Association, shall preside at all meetings of the Board of Governors and at the annual meeting of the Association. He shall have the usual duties pertaining to his office and such other duties as may from time to time be assigned him by the Board of Governors.

10. The Vice-Presidents shall, in the absence of the President, have and exercise the powers of the President, their order being determined alphabetically. The Board of Governors may assign to the Vice-Presidents such duties as may from time to time be determined.

11. The Secretary-Treasurer shall have the usual duties pertaining to the office of Secretary and of Treasurer, including the custody of the records of the Association and of its Corporate Seal, the keeping of minutes of the meetings of the Board of Governors and of the annual meeting and special meetings of members, and giving of due notice of all regular and special meetings of the Association and of the Board of Governors, and the supervision and safekeeping of the funds of the Association. The Secretary-Treasurer shall also have the duty of seeing that whenever Governors are elected, including the election of Governors to fill vacancies, a Certificate, under the Seal of the Association, giving the names of those elected and the term of their office, shall be recorded in the Office of the Recorder of Deeds for Cook County, Illinois. Such Certificates shall be signed by the Secretary-Treasurer and verified by oath of the President.

Article IV—Meetings

1. A meeting of the Association shall be held annually, at such time and place as the Board may direct. Special meetings of the Association may be called from time to time by the Board, or while the Board is not in session by the President of the Association, to be held at such time and place as may appear from the call.

2. The outgoing Board shall hold a meeting immediately preceding the annual meeting of the Association next succeeding their election, and the members of the new Board shall

hold a meeting and organize, by completing the Board, immediately succeeding the annual meeting of the Association at which the new members thereof were elected. Further meetings of the Board may be held from time to time at the call of the President or of any three(3) members of the Board.

3. Notice of any meeting of members of the Association shall be given by the Secretary-Treasurer at least thirty (30) days prior to the date set for each meeting. Notice of all meetings of the Board other than the regular meetings provided in Section 2 shall be given to each member of the Board at least fifteen (15) days prior to the date set therefor.

4. Any member of the Association or of the Board may waive notice with the same effect as if due notice had been given him.

5. At all meetings of the Association a quorum shall consist of not less than twenty-five (25) members and no business may be validly transacted at a meeting at which less than a quorum is present; *provided* that any meeting of the Association, whether or not a quorum be present, may be adjourned to a specified time and place by a majority of the members present without notice to the members at large other than the announcement at such meeting.

6. Members may take part and vote in person or by proxy at all meetings of the Association.

Article V—Sections

1. Any group of not less than ten (10) members of this Association may petition the Board for authority to organize a Section of the Association for the purpose of holding local meetings. The Board shall have power to specify the conditions under which such authority shall be granted.

2. The Association shall not be obligated to pay from its treasury any of the expenses of such Sections.

Article VI—Official Publications

1. The Association shall publish an official journal, which shall be sent free to all members of the Association in accordance with Article VII.

2. The Board shall have full control of the publication and sale of the official journal and of all other official publications.

3. There shall be appointed by the Board a body of Associate Editors who shall give assistance in connection with the official journal.

4. The Board shall from time to time, as the need arises, make special provision for the management of any other official publications.

5. The Board shall fix the price of the official journal and of any other official publications of the Association, but in no case shall the journal be sold to non-members for less than the annual dues of individual members.

Article VII—Dues

1. Individual members of the Association shall pay an initiation fee of Two Dollars ($2) at the time of election.

2. The annual dues of each individual member shall be Four Dollars ($4), including a subscription to the official journal.

3. The annual dues of each institutional member shall be Seven Dollars ($7), including two (2) subscriptions to the official journal.

4. All dues shall be payable on the first of January of each year. Should the annual dues of any member remain unpaid beyond a reasonable time, his name shall be dropped from the list after due notice.

5. New members entering the Association after April 1 of any year shall have their dues pro-rated for the balance of the year, except when they desire to receive the full current volume of the official journal.

6. Any member who because of age is no longer in active service, who is in good standing at the time of his retirement and who has been a member of the Association for twenty years, may, upon notifying the Secretary of said retirement, be exempt from the payment of dues, with the privilege of obtaining the official journal at an annual cost of one dollar.

Article VIII—Amendments to the Articles of Association and By-Laws

1. Changes in the Articles of Association or amendments to the By-Laws may be made at any annual meeting of the Association, or at any adjourned session thereof, or at any special meeting of the Association called for such purpose, by a two-thirds (⅔) vote of those present and entitled to vote; *provided* that due notice concerning such amendment shall have been printed in the official journal, or mailed to each member, at least one (1) month before the date of such meeting.

2. No changes in the Articles of Association shall have legal effect until a certificate thereof, verified by oath of the President and under Seal of the Association, attested by the Secretary-Treasurer, shall be filed in the office of the Secretary of State of the State of Illinois and recorded in the office of the Recorder of Deeds for Cook County, Illinois.

PERIODS OF SERVICE OF FORMER OFFICERS OF THE ASSOCIATION

(The periods were for the calendar years except that after 1942 the terms of Regional Governors began and ended July 1.)

Honorary President for Life

H. E. Slaught, December 1933–May 1937

Presidents

E. R. Hedrick....1916
Florian Cajori....1917
E. V. Huntington....1918
H. E. Slaught....1919
D. E. Smith....1920
G. A. Miller....1921
R. C. Archibald....1922
R. D. Carmichael....1923
H. L. Rietz....1924
J. L. Coolidge....1925
Dunham Jackson....1926
W. B. Ford....1927–1928
J. W. Young....1929–1930
E. T. Bell....1931–1932
Arnold Dresden....1933–1934
D. R. Curtiss....1935–1936
A. J. Kempner....1937–1938
W. B. Carver....1939–1940
R. W. Brink....1941–1942

Vice-Presidents

E. V. Huntington....1916
G. A. Miller....1916
D. N. Lehmer....1917, 1918
Oswald Veblen....1917
J. W. Young....1918, 1926
R. G. D. Richardson....1919
H. L. Rietz....1919
Helen A. Merrill....1920
E. J. Wilczynski....1920
R. C. Archibald....1921
R. D. Carmichael....1921, 1922
B. F. Finkel....1922
A. B. Chace....1923
L. P. Eisenhart....1923
J. L. Coolidge....1924
Dunham Jackson....1924, 1925
A. A. Bennett....1925, 1933, 1934
W. B. Ford....1926
A. J. Kempner....1927, 1928, 1935
Clara E. Smith....1927
F. D. Murnaghan....1928, 1939
E. T. Bell....1929, 1930
W. C. Graustein....1929, 1930, 1940
Arnold Dresden....1931
C. N. Moore....1931
W. H. Bussey....1932
G. C. Evans....1932
E. B. Stouffer....1933
E. P. Lane....1934
L. L. Dines....1935
N. A. Court....1936
T. C. Fry....1936
T. H. Hildebrandt....1937
E. J. Moulton....1937, 1938
H. E. Buchanan....1938
W. L. Hart....1939
R. W. Brink....1940
B. H. Brown....1941–1942
R. E. Langer....1941
Tomlinson Fort....1942–1943

Secretary-Treasurer

(Appointed by the Board after 1918)

W. D. Cairns....1916–1942

Committee on Official Journal

(Appointed by the Board. Discontinued after 1939)

H. E. Slaught....1916–1937
R. D. Carmichael....1916–1918
W. H. Bussey....1916–1918, 1926–1931
R. C. Archibald....1919–1921
W. A. Hurwitz....1919–1921
A. A. Bennett....1922
H. P. Manning....1921–1922
W. B. Ford....1923–1925
J. L. Coolidge....1923
A. J. Kempner....1924–1939
W. B. Carver....1932–1936, 1937–1939
E. J. Moulton....1937–1939

Editors-in-Chief after 1939

E. J. Moulton....1940–1941

ADDITIONAL MEMBERS OF THE BOARD

D. N. LEHMER.....1916–1918, 1922–1924, 1930–1932
R. E. MORITZ.....1916–1918
K. D. SWARTZEL.....1916
OSWALD VEBLEN.....1916, 1920–1922, 1926–1931
R. C. ARCHIBALD.....1916–1917, 1923–1930
FLORIAN CAJORI.....1916, 1918–1923, 1926–1930
M. B. PORTER.....1916–1917
J. W. YOUNG.....1916–1917, 1920–1922
B. F. FINKEL.....1916–1921, 1930–1935
E. H. MOORE.....1916–1921, 1923–1928
ALEXANDER ZIWET.....1916–1918
E. R. HEDRICK.....1917–1922, 1924–1929, 1932–1937
J. N. VAN DER VRIES.....1916–1918
HELEN A. MERRILL.....1917–1919
D. E. SMITH.....1917–1919, 1921–1926, 1937–1939
ELIZABETH B. COWLEY.....1918–1920
G. A. MILLER.....1918–1920, 1922–1924
E. J. WILCZYNSKI.....1918–1919, 1922–1926
L. P. EISENHART.....1919–1922, 1925–1930
E. V. HUNTINGTON.....1917, 1919–1927, 1933–1935
E. L. DODD.....1920
R. D. CARMICHAEL.....1920, 1924–1929, 1939–1941
A. A. BENNETT..1921, 1930–1932, 1939–1941
H. L. RIETZ.....1921–1923, 1925–1930, 1934–1936
C. F. GUMMER.....1921–1925
DUNHAM JACKSON.....1923–1929
CLARA E. SMITH.....1923–1925
A. B. CHACE.....1924–1925
J. L. COOLIDGE.....1926–1931
E. T. BELL.....1927–1928
E. P. LANE.....1928–1933
W. B. FORD.....1929–1934
E. R. SMITH.....1929
W. L. HART.....1930–1935
LAO G. SIMONS.....1930–1931
L. L. DINES.....1931–1933
T. C. FRY.....1931–1933
J. W. GLOVER.....1931–1933
H. E. BUCHANAN.....1932–1937
W. R. LONGLEY.....1932–1934, 1936–1938
E. J. MOULTON.....1933–1936
R. W. BRINK.....1934–1939
D. R. CURTISS..1934, 1937–1939, 1940–1942
J. L. WALSH.....1934–1936
ARNOLD DRESDEN.....1935–1940
J. O. HASSLER.....1935–1936
F. D. MURNAGHAN.....1935–1937
G. C. EVANS.....1936–1941
MARY EMILY SINCLAIR.....1936–1938
J. M. THOMAS.....1937–1939, 1940–1941
MARIE J. WEISS.....1937–1938
WILLIAM BETZ.....1938–1940
A. B. COBLE.....1938–1940
J. H. WEAVER.....1938–1940
PHILIP FRANKLIN.....1940–1942
F. L. GRIFFIN.....1940–1942
MAYME I. LOGSDON.....1940–1942
G. T. WHYBURN.....1940–1942
C. V. NEWSOM.....1940–1941
O. J. PETERSON.....1940–1941
F. B. WILEY.....1940–1941
H. M. BACON.....1941–1943
H. J. ETTLINGER.....1941–1943
CORNELIUS GOUWENS.....1941–1943
W. C. KRATHWOHL.....1941–1943
E. J. MCSHANE.....1941–1943
F. W. OWENS.....1941–1943
S. T. SANDERS.....1941–1943

ANNA

The Rhind Mathematical Papyrus

The late CHANCELLOR ARNOLD BUFFUM CHACE of Brown University rendered signal honor to the ASSOCIATION by publishing under its auspices his RHIND MATHEMATICAL PAPYRUS. The entire receipts from the sale of this great work go to form an endowment fund of the ASSOCIATION, known as the ARNOLD BUFFUM CHACE FUND.

Volume I, over 200 pages ($11\frac{1}{4}'' \times 8''$), contains the free Translation, Commentary, and Bibliography of Egyptian Mathematics.

Volume II, 140 plates ($11\frac{1}{4}'' \times 14''$) in two colors with Text and Introductions, contains the Photographic Facsimile, Hieroglyphic Transcription, Transliteration, and Literal Translation.

This exposition of one of the very oldest mathematical documents in the world is of great value, not only to students of mathematics, but to any one interested in the work of a civilization existing nearly 4,000 years ago.

The special price of $20.00 per set (postage prepaid) has been made for individual and institutional members of the ASSOCIATION when purchased through the SECRETARY; to all others the price is $25.00 per set (postage prepaid), obtainable only through the OPEN COURT PUBLISHING COMPANY, LaSalle, Illinois.

The Carus Mathematical Monographs

The CARUS MATHEMATICAL MONOGRAPHS are an expression of the desire of Mrs. Mary Hegeler Carus, and of her son, Dr. Edward H. Carus, to contribute to the dissemination of mathematical knowledge by making accessible at nominal cost a series of expository presentations of the best thoughts and keenest researches in pure and applied mathematics.

The expositions of mathematical subjects which the monographs contain are set forth in a manner comprehensible not only to teachers and students specializing in mathematics, but also to scientific workers in other fields, and especially to the wide circle of thoughtful people who, having a moderate acquaintance with elementary mathematics, wish to extend their knowledge without prolonged and critical study of the mathematical journals and treatises.

MONOGRAPHS THUS FAR PUBLISHED

No. 1. *Calculus of Variations,* by Professor G. A. Bliss. (First Impression, 1925; Second Impression, 1927; Third Impression, 1935.)

No. 2. *Analytic Functions of a Complex Variable,* by Professor D. R. Curtiss. (First Impression, 1926; Second Impression, 1930.)

No. 3. *Mathematical Statistics,* by Professor H. L. Rietz. (First Impression, 1927; Second Impression, 1929; Third Impression, 1936.)

No. 4. *Projective Geometry,* by Professor J. W. Young. (First Impression, 1930; Second Impression, 1938.)

No. 5. *History of Mathematics in America before 1900,* by Professors David Eugene Smith and Jekuthiel Ginsburg. (First Impression, 1934.)

No. 6. *Fourier Series and Orthogonal Polynomials,* by Professor Dunham Jackson. (First Impression, 1941.)

No. 7. *Vectors and Matrices,* by Professor C. C. MacDuffee. (First Impression, 1943.)

Price $1.25 per copy to members of the Mathematical Association, one copy to each member, when ordered directly through the office of the Secretary, McGraw Hall, Cornell University, Ithaca, N.Y.

Additional copies for members, and copies for non-members, may be purchased from the Open Court Publishing Co., La Salle, Illinois, at the regular price of $2.00 per copy.

VOL. 11

JAN.

2

TECHNOLOGY DEPT.

THE AMERICAN MATHEMATICAL MONTHLY

DEVOTED TO THE INTERESTS OF
COLLEGIATE MATHEMATICS

VOLUME 51 NUMBER 2

CONTENTS

College Mathematics During Reconstruction . . . R. W. Brink 61
Cardioids Associated with a Cyclic Quadrangle . . V. O. McBrien 74
Affine Geometry of Convex Quartics . . . . Douglas Derry 78
Discussions and Notes . . . . . Louis Brand, O. S. Adams 84
Problems and Solutions 88
News and Notices 104
War Information 109
Notes on the Navy V-12 Program 109
The Training Programs in Meteorology 109
The Alien Book Republication Program 110
Mathematicians and the New Selective Service Regulations . . 112
The Mathematical Association of America 115
The Twenty-Seventh Annual Meeting of the Association . . . 115
Indiana Section Meeting 119
Calendar of Future Meetings 122

FEBRUARY 1944